LEGEND

Item	Symbol
EXISTING CONTOUR	352
WETLANDS	
PROPERTY LINE	
BUFFER LINE	
TREE LINE	
EXISTING ROAD	
EXISTING STREAM	
SOIL BORING	B-10
PIEZOMETER	PZ-7
EXISTING STORM PIPE	24" CMP
EXISTING DROP INLET	
EXISTING HEADWALL	
PROPOSED CONTOUR	362
PROPOSED SURVEY CONTROL MARKER	
PROPOSED STORM PIPE	
PROPOSED DROP INLET	
PROPOSED HEADWALL	
PROPOSED LEACHATE PENETRATION ASSEMBLY AND PERFORATED PIPE	
PROPOSED LEACHATE MANHOLE OR PUMPIING STATION AND SOLID PIPE	
PROPOSED LEACHATE CLEANOUT	
PROPOSED SILT FENCE	
PROPOSED INLET PROTECTION	
PROPOSED OUTLET PROTECTION	
EXISTING METHANE GAS MONITORING POINT	MM-5 △
EXISTING UPGRADIENT GROUNDWATER WELL	GWA-1 ○
EXISTING SIDE GRADIENT GROUNDWATER WELL	GWB-1 ○
EXISTING DOWN GRADIENT GROUNDWATER WELL	GWC-1 ○
EXISTING UPGRADIENT SURFACE WATER MONITORING POINT	SWA-1 □
EXISTING DOWN GRADIENT SURFACE WATER MONITORING POINT	SWC-1 □
PROPOSED METHANE GAS MONITORING POINT	MM-7 ▲
PROPOSED UPGRADIENT GROUNDWATER WELL	GWA-2 ⬢
PROPOSED SIDE GRADIENT GROUNDWATER WELL	GWB-2 ⬢
PROPOSED DOWN GRADIENT GROUNDWATER WELL	GWC-6 ⬢
PROPOSED UPGRADIENT SURFACE WATER MONITORING POINT	SWA-2 ■
PROPOSED DOWN GRADIENT SURFACE WATER MONITORING POINT	SWC-2 ■

INDEX TO DRAWINGS

GEORGIA
Environmental Protection Division
Solid Waste Management Program
MINOR MODIFICATION APPROVAL
SOLID WASTE PERMIT NO. 040-008D (MSWL)
APPROVED BY: RJ DATE: 3/28/19

RECEIVED
MAR 06 2019
SOLID WASTE MANAGEMENT PROGRAM

(R) INDICATES WHAT ON THIS SHEET WAS REVISED, NOT THE SHEET THAT WAS REVISED. (SHEETS REVISED IN THE FEBRUARY 2019 SUBMITTAL INCLUDE SHEET 22, SHEET 25, SHEETS 31–33, AND SHEET 35. SHEET 22A WAS ADDED.)

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REVISION HISTORY

DATE	DESCRIPTION
SEPTEMBER, 2000	ORIGINAL
FEBRUARY 28, 2019	(R) REVISED SHEETS TO RELFECT CCR MGT PLAN

GEORGIA REGISTERED 2-28-19 NO. 23707 PROFESSIONAL ENGINEER JEFFREY M. BROWNE

DESIGN AND OPERATIONS PLAN
CRISP COUNTY US41S MSW LANDFILL
SITE #2 EXPANSION
PERMIT NO. 040-008D(MSW)
CRISP COUNTY, GEORGIA

BROWNE AND COMPANY, LLC
2719 Sheraton Drive · Building C, Suite 210
Macon, Georgia 31204 Ph/Fx: 478-743-4843

SCALE: AS SHOWN
EDIT DATE: FEBRUARY 28, 2019
PROJECT NUMBER: 185-10-0104
SHEET NAME: INDEX TO DRAWINGS AND LEGEND
SHEET 1 OF 35

OPERATIONS PLAN

1. **VOLUME CALCULATIONS:**

	Cell Nos. 1–7	Cell Nos. 8–16	Sub–total Cells 1–16	C&D Area	Total Site
Total volume of waste & cover (cubic yards)	1,780,000	8,130,184	9,910,184	240,900	10,151,084
Soil volume for cover (cubic yards)	350,000	2,032,546	2,382,546	60,225	2,442,771
daily cover (cubic yards)	65,000	508,136	573,136	–	573,136
intermediate cover (cubic yards)	150,000	1,117,900	1,267,900	12,045	1,279,945
final cover (cubic yards)	135,000	406,510	541,510	48,180	589,690
available on-site (cubic yards)	10,000	50,000	60,000	25,000	85,000
imported (cubic yards)	340,000	1,982,546	2,322,546	35,225	2,357,771
Waste volume (cubic yards)	1,430,000	6,097,638	7,527,638	180,675	7,708,313
Area of site: Total (acres)	106	90.2	196.2	8.8	205
Usable (acres)	23.6	69.5	93.1	6.6	99.7
Estimated life of site (years)	±5	±82.7	±87.7	±30	±87.7

2. **CONTROLLED UNLOADING OF WASTE:**
Solid waste unloading shall be restricted to the working face of the cell in such a manner that waste may be easily incorporated into the municipal solid waste landfill with available equipment. Scavenging shall be prohibited.

(R) A second working face is permitted at the site of the CCR block disposal area. This area will be limited to an approximately 200 foot by 400 foot disposal area located primarily in Cell No. 11 on top of at least one lift of previously disposed waste, and against the existing prior–filled slope of Cell No. 10. Only CCR material will be placed in this second working face. Additional disposal guidance is shown in Paragraph 54, CCR Management Plan.

3. **SPREADING AND COMPACTION:**
Solid Waste shall be spread in uniform two foot layers and compacted to its smallest practical volume, by 3 to 5 passes with compaction equipment, before covering with earth. The working face shall have a 4:1 slope when using a compactor and a 3:1 slope when using a track type machine. The maximum width of the working face shall be 200 feet.

4. **(A) DAILY COVER (MSW CELLS ONLY, INCLUDING CCR DISPOSAL AREA):**
A uniform compacted 6" thick layer of clean earth shall be spread over all waste at the end of the day's operations. Alternative fabric cover meeting the conditions listed below may also be utilized for daily cover. The daily cover shall meet the following standards:
(1) The daily cover must be capable of preventing attraction of disease vectors, minimizing production of odors, preventing blowing litter, preventing fires, preventing scavenging, and;
(2) Must be capable of completely covering the solid waste without change in the cover's properties by rain, heat, cold and other climatic conditions, and;
(3) Must be substantially free of rock fragments that are greater than six inches in diameter.
(4) Material for daily cover shall come from future cell excavation or permitted borrow pits.
(B) MONTHLY COVER (C&D CELL ONLY):
A layer of soil shall be placed over the waste at the end of each month or as directed by EPD. The soil layer shall be a minimum of one foot thick after compaction in all locations. The cover shall be graded to prevent the trapping of water. Cover will be vegetated if area is not to be disturbed for a period of three months or longer. On–site materials shall be used to construct the cover to the extent possible. If on–site sources of cover material are exhausted, material will be imported from a source approved and permitted by EPD. The cover shall meet the following criteria unless the Director grants a variance based on alternatives providing comparable protection of the environment:
(1) Must be capable of preventing disease vectors, odors, blowing litter and other nuisances;
(2) Must be capable of completely covering the solid waste after it is placed without change in its properties and without regard to weather;
(3) Must be capable of allowing loaded vehicles to successfully maneuver over it after placement;
(4) Must be noncombustible and must not include rock fragments greater than six inches in diameter;
(5) Must be capable of supporting vegetation.

5. **INTERMEDIATE COVER (MSW CELL):**
If more than one lift is required in a cell, a uniform compacted layer of clean earth cover not less than one foot in depth shall be placed over each intermediate lift. One foot of intermediate cover shall be placed on all waste disposal areas exposed more than one month. This cover material shall meet the same criteria for daily cover plus be capable of supporting the germination and propagation of vegetative cover. Intermediate cover may be omitted from the CCR disposal area if the disposal remains active. (R) If CCR disposal ceases for more than one month, proper intermediate soil cover will be placed over the exposed CCR material.

6. **(A) FINAL COVER (MSW CELL ONLY):**
The MSW final cover system is designed to reduce infiltration and erosion. The erosion layer will be composed of 24" of soil capable of sustaining plant material that sustains native plant growth. The infiltration layer will be composed of 18" of earthen material. The infiltration layer is immediately below the drainage layer, 40 mil FML textured liner and the erosion layer. The infiltration layer is installed on top of the 6" daily or 12" intermediate cover.
(B) FINAL COVER (C&D CELL ONLY):
The C&D final cover system shall be constructed in accordance with the closure details in these plans. A minimum 18" layer of clay with a maximum of $1x10^{-5}$ cm/sec shall be placed over 12" of final soil cover. The erosion layer shall be placed over the 18" clay layer and shall be composed of 6" of soil capable of sustaining plant material that sustains native plant growth.

7. **GRADING AND DRAINAGE:**
The disposal site shall be graded and drained to reduce runoff onto the landfill, to reduce erosion, and to drain water from the surface of the landfill. All construction grades will be a minimum of 2% to promote drainage. Final slopes shall be between 3% and 33%, shall be graded relatively smooth, and shall be vegetated.

8. **FIRE PROTECTION:**
The disposal site shall be designed, constructed, maintained and operated to reduce the potential for fire or explosion. Suitable measures to control fires that may start shall be provided. A minimum supply of one day of cover material, minimum 100 cubic yards, must be maintained within 200 feet of the working face for fire fighting purposes.

9. **SITE SUPERVISION:**
Overall site supervision will be accomplished by the Landfill Supervisor. The landfill supervisor shall be a Certified Landfill Operator in accordance with O.C.G.A. 12–8–24.1. A copy of the approved Design and Operation Plan shall be kept at the site at all times. EPD shall approve any changes in the approved plans, prior to implementation. The on–site supervisor shall be properly trained in the operation of municipal solid waste landfills and the implementation of design and operational plans and must be present at all times during operation.

10. **CONTINUITY OF OPERATION:**
Access to fill location areas will be maintained to insure continued operation during wet weather. All areas of the site are considered adequate for wet weather operations. Provisions shall be made for prompt equipment repair or replacement when needed.

11. **SILTATION AND EROSION CONTROL:**
Erosion and sediment control measures and devices shall be installed in accordance with the plans and detail drawings. All erosion and sedimentation control measures or facilities, whether temporary or permanent, shall be continuously maintained by the operator so as to be effective. Runoff from the facility must be directed to and flow through permanent sediment control impoundments which are designed to assure discharges meeting the requirements of O.C.G.A. 12–7–6(18) and will handle the sediment load for the life of the site, and the hydraulic load for a 25–year, 24–hour storm event. Erosion and sedimentation control measures and facilities will be employed prior to and concurrent with clearing, grading, overburden removal, access or other land disturbing activities for preparation of the site for landfilling. Immediate measures must be implemented to establish vegetation on disturbed exposed soil which will not be a part of the waste disposal area, or which will remain exposed for more than three (3) months.

12. **VEGETATIVE PLAN:**
All disturbed areas shall be grassed and maintained in accordance with the following schedules. Vegetative cover for the final cover must take place within two (2) weeks after final cover placement. Any disturbed areas which will remain exposed for longer than three (3) months and permanent covers which are slow to establish shall receive temporary seeding. The fertilizer requirements are suggested. Planting dates, fertilizer rates, and seeding rates shall meet the requirements in the Manual for Erosion and Sediment Control in Georgia.

SEEDS – PERMANENT	LBS/ACRE	DEPTH OF COVER	DATE OF PLANTING
BERMUDA, COMMON – HULLED	10	1/4" – 1/2"	2/15 – 6/30
BERMUDA, COMMON – UNHULLED	10	1/4" – 1/2"	10/1 – 2/28
BAHIA, PENSACOLA	60	1/4" – 1/2"	1/1 – 12/31
SEEDS – TEMPORARY	**LBS/ACRE**	**DEPTH OF COVER**	**DATE OF PLANTING**
MILLET, PEARL	50	1/4" – 1/2"	4/1 – 8/31
RYEGRASS, ANNUAL	40	1/4" – 1/2"	1/1 – 3/31 & 8/15 – 12/31

Note: 1. All seeding rates are pure live seed rates.
2. All seeding shall be mulched with clean dry hay at the rate of 2.5 tons per acre. Mulch shall be anchored by pressing the mulch into the soil immediately after the mulch is spread using a packer disk or disk harrow or equivalent piece of equipment.
3. Temporary seeding should also complement permanent seeding to produce a suitable cover while the permanent grasses germinate.
4. Undisturbed slopes greater than 3%, including soil stockpiles, are to be mulched immediately.

FERTILIZER REQUIREMENTS

TYPE OF SPECIES	YEAR	ANALYSIS OR EQUIVALENT N–P–K	RATE	N TOP DRESSING RATE
1. Cool season grasses	First	6–12–12	1500 lbs./ac.	50–100 lbs./ac.(1)(2)
	Second	6–12–12	1000 lbs./ac.	–
	Maintenance	10–10–10	400 lbs./ac.	30
2. Cool season grasses and legumes	First	6–12–12	1500 lbs./ac.	0–50 lbs./ac.(1)
	Second	0–10–10	1000 lbs./ac.	–
	Maintenance	0–10–10	400 lbs./ac.	–
3. Ground covers	First	10–10–10	1300 lbs./ac.(3)	–
	Second	10–10–10	1300 lbs./ac.(3)	–
	Maintenance	10–10–10	1100 lbs./ac.	–
4. Pine Seedlings	First	20–10–5	one 21–gram pellet/seedling placed in closed hole	–
5. Shrub Lespedeza	First	0–10–10	700 lbs./ac.	–
	Maintenance	0–10–10	700 lbs./ac.(4)	–
6. Temporary cover crops seeded alone	First	10–10–10	500 lbs./ac.	30 lbs./ac.(5)
7. Warm season grasses	First	6–12–12	1500 lbs./ac.	50–100 lbs./ac.(2)(6)
	Second	6–12–12	800 lbs./ac.	50–100 lbs./ac.(2)
	Maintenance	10–10–10	400 lbs./ac.	30 lbs./ac.
8. Warm season grasses and legumes	First	6–12–12	1500 lbs./ac.	50 lbs./ac.(6)
	Second	0–10–10	1000 lbs./ac.	–
	Maintenance	0–10–10	400 lbs./ac.	–

(1) Apply in spring following seeding.
(2) Apply in split applications when high rates are used.
(3) Apply in 3 split applications.
(4) Apply when plants are pruned.
(5) Apply to grass species only.
(6) Apply when plants grow to a height of 2 to 4 inches.

13. **SURVEY CONTROL:**
Survey control will consist of both temporary and permanent control markers. Permanent markers will establish the "permanent", or lifelong horizontal and vertical control such as the edge of each cell, leachate cleanouts, and monitoring points. Horizontal control consists of northing and easting (X–Y) coordinates. The X–Y coordinate establishes a single horizontal point on the earth which can be reestablished at any time based on this single location. Vertical control is an elevation measured above a datum (Z). The datum is Mean Sea Level (MSL). Vertical control for this site is determined from a survey to a United States Geological Survey (USGS) control monument. Utilizing survey methods carried out by a Registered Land Surveyor (RLS), the permanent survey control has been established.

Temporary Survey control consists of monuments and stakes installed by an RLS. Examples of temporary control can include temporary monuments with X–Y–Z coordinates for operator guidance and construction accuracy. This will include survey control markers along the temporary edge of liner and posts within a cell which indicate the extent of fill in a particular lift. Additionally, temporary control can include construction stakeout. Construction stakeout will require the RLS to place stakes and offset stakes at the location where specific construction elements will be installed. These stakes will be installed to designate the single specific X–Y–Z coordinate point on the earth where that constructed element will be built.

The primary purpose of site survey control, as required by the rules is:
"Site survey control shall be provided to ensure the operation will be on permitted lands."
The rule further states:
"Survey control will be accomplished through use of permanent, accessible benchmarks, survey control stakes, and/or boundary markers which designate and/or delineate all permitted areas. Survey control shall be indicated on the design and operational plan. Where necessary for construction or operational purposes, vertical as well as horizontal survey control will be established and maintained to delineate fill boundaries, buffers, and property boundaries." For this site, survey control will be utilized for construction, operations, delineating fill boundaries, buffers, and property boundaries. Also, survey control will be utilized for other items as required by the operator.

14. **WATER MONITORING:**
Surface water and groundwater shall be monitored according to the approved Environmental Monitoring Location Plan and the Water Monitoring Plan.

15. **METHANE GAS CONTROL:**
Methane gas control shall include quarterly sampling for methane gas at the locations shown on the plans and monitoring for possible stressed vegetation due to methane gas movement. Monitoring points are based upon site geology, topography, and location of on–site or adjacent structures. Results of monitoring and sampling shall be submitted to the Atlanta (International Parkway) Office of the EPD (Solid Waste Management Program) within 30 days of a test. A copy of these results shall be forwarded to the Southwest Region Office of EPD. The concentration of methane generated by the facility shall not exceed 25% of the lower explosive limit for the gases in facility structures and shall not exceed the lower explosive limit for methane at the facility property boundary. Methane vents shall be installed at the frequency of one per acre of landfill footprint at the time of closure of any portion of the landfill. The vents shall be installed according to the detail shown on the plans. Vents shall be installed once the final cap is in place and the area is closed. At least one vent per cell shall be tested on an annual basis for the constituents shown below. The testing shall begin after a portion of the landfill is closed with a permanent cap. The frequency of testing will be reviewed and may be altered by way of an EPD approved modification.

Gas Constituency Analysis		Well Data
Methane	Percent by Volume	Depth of Waste (Ft.)
Carbon Dioxide	Percent by Volume	Depth of Water Table (Ft.)
Oxygen	Percent by Volume	Depth of Well (Ft.)
Nitrogen	Percent by Volume	
Propane and Heavier Hydrocarbons	Percent by Volume	
Total Sulphur	PPM	
Reduced Sulphur (as H2S)	PPM	
Total Halogen	PPM	
Vinyl Chloride Monomer	PPM	
Chlorinated Organics	PPM	
Moisture Content	Percent by Volume	

Vents serve a two–fold purpose. One, they help reduce pressure on the final cap system to help prevent the inflating of the cap, which usually results in cap damage or failure. Two, controlled venting of landfill gases helps reduce and prevent off–site migration and collection in buildings, on or adjacent to, the landfill. Collection of gases in buildings could result in an explosion. Therefore, the number, placement, and performance of methane gas vents shall be reviewed by a professional engineer after installation. Should additional vents be needed, a proper modification will be filed and approved by EPD prior to installing any additional vents.

16. **LEACHATE OUTBREAKS:**
All leachate outbreaks and seeps shall be covered with a minimum of 12" of compacted soil and grassed in accordance with the Vegetative Plan.

17. **SITE EQUIPMENT:**
Minimum suggested equipment to be used on the site includes:
1 – Bulldozer; 1 – Track Loader
1 – Steel Wheel Compactor; 1 – Dump Truck
1 – Scraper; Other Equipment as Needed
Equipment shall be maintained on a regular basis and kept in good working order. From time to time, this equipment may be replaced with similar equipment, or additional equipment may be rented for cleaning sediment from basins.

18. **BACKUP EQUIPMENT:**
Rental equipment shall be used for backup equipment and for cleaning sediment from basins.

19. **DIRECTIONAL AND INFORMATIONAL SIGNS:**
Directional and informational signs will be located at the site which indicate the days and hours of operation. Temporary information (R) and directional signs shall be used at the operator's discretion to direct vehicles to the active working face. Access to the site will be limited to those times when authorized personnel are on duty. The CCR disposal area will be clearly marked with a sign.

20. **LITTER CONTROL:**
Scattering of wastes by wind shall be controlled by fencing or other barriers, and the entire site shall be inspected daily and all litter removed.

21. **DUST CONTROL:**
Dust control will be provided if deemed necessary through the use of a water wagon and shall be limited to site roadways. (R) Additional dust control required for CCR management is shown in Paragraph 54, item 3.

22. **ON–SITE FIRST AID:**
A first aid kit will be available on site.

23. **SITE COMMUNICATIONS:**
A telephone will be available on site.

24. **EMPLOYEE FACILITIES:**
Sanitary facilities including a potable water supply will be available on site.

25. **This item is not used.**

26. **ON–SITE SOLID WASTE PROCESSING PERFORMED:**
There will be no solid waste processing performed on site, other than the inert landfill and grease solidification facilities now permitted.

27. **WASTE REQUIRING SPECIAL HANDLING:**
Asbestos waste may be disposed of at this site at the operator's discretion. Listed below are the procedures for its disposal.
1. Asbestos containing waste shall be sealed in leak–proof containers labeled with: "Caution—Contains Asbestos Fibers —Avoid Opening or Breaking Container —Breathing Asbestos is Hazardous to Your Health."
2. Asbestos containing waste shall be disposed of in such a manner as not to destroy the integrity of the asbestos containers prior to the placement of cover material. This waste shall be completely covered immediately after deposition with a minimum of six (6) inches of non–asbestos material.
3. Disposal of asbestos is to conform to applicable sections of 40 CFR Parts 61.153 to 61.156. Site should only accept asbestos that has been recovered and transported in accordance with NESHAP regulations (parts 61.140 – 61.156).
4. Asbestos, disposed of in the landfill, shall be located according to area of the cell and lift number, and documented in the operating record as well as the amount of asbestos in cubic yards or pounds.

28. **SITE CLOSURE:**
The site will not be closed until all wastes have been covered or disposed of by an adequate method of disposal so that the site will be in full compliance with section 391–3–4–.11 and .12 of the Rules and Regulations for Solid Waste Management, Chapter 391–3–4. The Closure and Post–Closure Care Plan for this site is described in the narrative plans attached.

29. **SEPARATE DISPOSAL AREAS FOR WASTE REQUIRING MONTHLY COVER:**
Not Applicable

30. **ZONING:**
The site meets Crisp County zoning requirements.

31. **SITE ACCEPTABILITY CONDITIONS:**
The following Site Limitations for the Crisp County – US 41S #2 MSW Landfill Expansion were issued by the Environmental Protection Division on September 7, 2000.

1. The recommendation for site acceptability is limited to that area that is bounded by the line designated "Expansion Property Line" on the below–referenced topographic map(4), exclusive of those areas previously granted site acceptability.

2. A liner and leachate collection system must be constructed under all areas proposed for waste disposal. The liner must be constructed at least five feet above the seasonal high water table. Because the water table characterized on Figure 9 of Bunnell–Lammons Engineering, Inc.'s (BLE) "Water Table Elevation Contour Map of the Shallow Hawthorne Aquifer" may not represent a seasonal high water table, the liner must be kept 10 feet above the water table elevations depicted on Figure 9. In the eastern portion of the site, enclosed by a line designated "Area where groundwater not present in comparable Hawthorne sediments" on Figure 9, cut elevations must not extend below 390 feet (above mean sea level).

As an alternative to constructing the liner 10 feet above the water table depicted on Figure 9, a capillary break could be constructed between the liner and the water table, to ensure that the seasonal water table does not rise to within five feet of the bottom of the liner. The applicant must demonstrate, through standard engineering analysis that the capillary break system would keep the groundwater from rising, at any point in the system, to within five feet of the liner.

The project engineer must make periodic quality control inspections while the liner system and capillary break system (if installed) are under construction, and should certify the proper installation of the systems.

3. No solid waste shall be disposed of in U.S. Army Corp of Engineers jurisdictional wetland areas, as delineated on the site topographic map unless permitted by the Corps of Engineers. A fifty–foot horizontal buffer must be maintained between the landfill and wetland areas. The wetland areas must be delineated on the design and operation plan.

4. No solid waste shall be disposed of in the area designated as "Area inundated by 100–Year Flood" on the site topographic map(4). A minimum five–foot vertical buffer must be maintained between the landfill bottom and the 100–year flood elevation shown on the same map. The 100–year flood elevation(s) must be shown on the design and operation plan.

5. A minimum 500–foot buffer must be maintained between the waste disposal boundary and any occupied dwelling or any dwelling's water supply well, and any public water supply wells. Adjacent houses, wells, and the 500–foot buffer must be shown on the design and operation plan. A minimum 200–foot buffer must be maintained between the waste disposal boundary and the property boundary.

6. All drainage structures must be designed and constructed to minimize the potential for erosion. All drainage structures must be channeled to a sediment control impoundment. All erosion control measures should comply with the "Manual for Erosion and Sedimentation Control in Georgia" or equivalent.

7. All temporary piezometers at this site must be plugged and abandoned in accordance with the Water Well Standards Act. Additionally, piezometers located in potential waste disposal areas must have the casing pulled from the hole and must be grouted, with a "non–shrinking" cement, from the bottom of the hole up to within approximately ten feet of the bottom of the landfill. The last ten feet of the borehole must be filled in with bentonite.

8. Groundwater, surface water, and methane monitoring programs must be implemented at this site. The on–site water well located at the baler facility (Well #13 on Figure 3 in BLE's report), must be incorporated into the groundwater monitoring plan. Any groundwater seeps on the site must be included in the surface water monitoring plan. Sampling parameters, sampling schedules, monitoring well construction, monitoring well spacing, etc. must adhere to the guidelines established in the Environmental Protection Division's Rules of Solid Waste Management, Chapter 391–3–4.

References
1. Bunnell–Lammons Engineering, Inc's "Report of Site Hydrogeologic Assessment for Landfill Expansion, Crisp County Municipal Solid Waste Landfill, Crisp County, Georgia," dated October 21, 1999. This report was submitted as part of Hodges, Harbin, Newberry & Tribble, Inc.'s (HHNT) "Application for Solid Waste Handling Permit and Request for Site Suitability," dated November, 1999.

2. HHNT's May 22, 2000 correspondence entitled "Site Assessment, Crisp County MSWLF —Phase 5, Horizontal Expansion."

3. HHNT's July 20, 2000 transmittal entitled "Site: Assessment, Crisp County MSWLF – Phase 5, Horizontal Expansion," and attachment entitled "Demonstration of 100–Year Flood Elevations for the Crisp County U.S. 41S MSW Landfill Expansion," dated July, 2000.

4. HHNT's plan sheet entitled "Existing Topographic Information, Design and Operation Plan for Crisp County U.S. 41S MSW Landfill Expansion, Crisp County, Georgia," dated August, 2000 and edited on August 18, 2000.

32. **LIMITED ACCESS:**
The Georgia Rules require limited access: a gate or other barrier shall be maintained at potential vehicular access points to block unauthorized access to the site when an operator is not on duty. A fence or other suitable barrier must be provided around the site, including impoundments, leachate collection, and treatment systems and gas venting and processing facilities, sufficient to prevent unauthorized access.

At the Crisp County Landfill, this vehicular access control is accomplished by use of natural and manmade structures. The majority of the perimeter of the site is heavily wooded. Tree spacing and undergrowth are sufficient to prevent vehicular access. Where roads enter the facility boundary, gates will be installed to control access. The perimeter of the site will be posted with signs notifying the public that this is a "Municipal Solid Waste Landfill Facility" and that access is prohibited except at the site entrance.

The combination of a natural wooded barrier, access control gates, fences, and adequate signage will provide a suitable barrier around the site.

33. **ENVIRONMENTAL PROTECTION:**
The landfill shall be operated in such a manner as to prevent air, land, or water pollution, and public health hazards.

34. **HAZARDOUS WASTE:**
The operator shall have a hazardous waste management plan for excluding prohibited wastes. Excluded wastes include lead acid batteries, radioactive waste, regulated quantities of hazardous waste, polychlorinated biphenyl (PCB) waste as defined in 40 CFR, Part 761, and liquids as allowed in Paragraph 35. The prohibited waste exclusion plan is attached.

35. **LIQUID WASTES:**
(A) No liquid waste, either bulk or containerized, shall be placed in the landfill unless containerized in a container of one (1) gallon capacity or less. No generator may discard in excess of four (4) gallons of liquids in containers.
(B) If liquid waste is demonstrated nonhazardous and is admixed with a bladeable material to render it non–liquid, it may be acceptable for disposal at the landfill with the concurrence of the landfill operator.
(C) "Liquid Waste" means any waste material that is determined to contain "free liquids" as defined by Method 9095 (Paint Filter Liquids Test), as described in "Test Methods for the Evaluation of Solid Wastes, Physical/Chemical Methods" (EPA Pub. No. SW–846).

36. **OPERATIONAL RECORDS / DAILY LOGS:**
Accurate written, daily records by actual weight shall be kept of all waste received at the landfill. Copies of such records shall be maintained for a period of at least three (3) years and shall be made available to the Division upon request. This facility will meet the record–keeping requirements as found in the Georgia Rules for Solid Waste Management, 391–3–4–.07(3)u.

37. **SITE USE AFTER CLOSURE:**
Upon closure of the site, all areas will receive vegetative cover, and a land use study will be performed and submitted to EPD. A copy of the land use study shall be submitted to EPD within 90 days of closure. Any post–closure use of the landfill property must be approved by EPD.

38. **LEACHATE COLLECTION. TREATMENT AND ANALYSIS:**
Leachate will be pumped to two (2) leachate storage tanks (150,000 gallons each). The tanks shall have secondary containment and provisions for pump and haul recirculation.

Leachate shall be recirculated by direct application to the open working face in a manner which does not cause runoff, odors, or operational difficulties. Records shall be maintained in the operation log consisting of the date of application, volume applied. and results of monthly analysis. The leachate shall be applied using a water truck by spraying the leachate on the working face with the truck.

The following conditions will be followed when applying leachate to the working face by tanker truck:
1. A (non–potable water) water tanker will be used. The tanker will not be used for dust control, unless thoroughly rinsed, with the rinse water returned to the leachate tanks.
2. Leachate will not be recirculated during periods of heavy rain, wind or other inclement weather conditions.
3. Leachate will not be recirculated through the working face when filling on the outside slopes. All leachate will drain back into the waste and will not be allowed to run–off as surface water.
4. All waste vehicles will be clear of the area during recirculation activities.
5. Odors will be controlled and kept to a minimum.

Leachate shall be disposed by pump and haul to Hi-Tech Water Works, a commercial wastewater treatment facility in Tifton, Georgia, or through on-site recirculation. The Operator shall record on a weekly basis the volume stored in the leachate tanks, and the volume transported to a wastewater treatment facility.

A representative sample from the leachate tanks shall be analyzed semi–annually during groundwater monitoring events for Appendix I parameters. Should assessment monitoring be initiated due to groundwater contamination, the leachate shall also be tested for Appendix II constituents.

39. **LEACHATE SYSTEM MAINTENANCE AND INSPECTION:**
A. Leachate Collection and Header Pipes —
The continuing operation of the leachate collection system is important to the operations of the overall landfill facility. Therefore, as necessary, leachate collection lines should be cleaned on an annual basis. Lines shall be cleaned with high pressure water jets passed through the lines from the cleanout entrance to the leachate sump. The high pressure cleaning equipment shall be similar to sanitary sewer cleaning equipment. This equipment shall not utilize cutters capable of damaging the collection lines. Only high pressure water jets on sewer cleaning equipment shall be utilized.
B. Leachate Storage Tanks —
The leachate storage tanks shall be inspected daily for visible leaks. The leak detection system should also be inspected on a daily basis. Leachate should be removed on a continuing basis. As soon as more than 10 feet of leachate accumulates in the tank it shall be removed. At no time shall leachate be allowed to accumulate to a depth of one–half the tank capacities without being in the process of being removed.

40. **REMEDIAL ACTION FOR LINER AND LEACHATE COLLECTION SYSTEM:**
The operator shall immediately notify the Division and describe remedial steps to be taken if:
1) Operation of the treatment facilities under the approved plan cannot prevent any of the following:
(i) Violating the terms of its permits, the Georgia Water Quality Control Act and regulations, thereunder.
(ii) Surface water or groundwater pollution.
2) The facility is generating a quality or quantity of leachate that exceeds the design capacity of any future on–site pretreatment system.
3) Failure of the liner or leachate collection is suspected or documented.

41. **CONSTRUCTION CERTIFICATION:**
Upon receipt of a final and effective solid waste handling permit, construction may commence in accordance with the approved design and operational plan and permit conditions. Prior to receipt of solid waste, the Division must be provided with written certification by a professional engineer licensed to practice in Georgia, that the facility has been constructed in accordance with the approved permit. Unless notified otherwise by the Division, within 15 days of receipt by the Division of the written certification, the facility owner or operator may commence disposal of solid waste. This process shall be repeated lor each subsequent major construction phase, including but not limited to, new cells or trenches, additional monitoring wells, sediment ponds, leachate treatment systems, modifications adding a new solid waste handling process, and appiication of final cover.
The approved CQA Manual and Technical Specifications shall he used for each cell construction and shall not be amended unless approved by the Georgia EPD.
No construction changes shall be made unless approved by the Georgia EPD.
Borrow soils must came from sites with appropriate land disturbing permits.

42. **RESPONSIBLE INDIVIDUAL:**
The following person shall be available 24 hours per day at the telephone number listed:
(R) Site Operator
Day: (229) 276–2656 Night: (229) 276–2692

43. **SEQUENCE OF FILL:**
The sequence of fill shall progress as described an sheets 12 – 21 in the Design and Operation Plan, unless modified.

44. **AIR CRITERIA:**
The owner and/or operator of this MSWLF unit will ensure that the unit does not violate any applicable requirements developed under a State Implementation Plan (SIP) approved or promulgated by the U.S. Environmental Protection Agency pursuant to Section 110 of the Clean Air Act, as amended.

45. **OPEN BURNING:**
There shall be no opening burning of solid waste at this MSWLF unit. A plan must be submitted to and approved by the Georgia EPD prior to the infrequent burning of agricultural wastes, silvicultural wastes, landclearing debris, diseased trees, debris from emergency cleanup operations, or debris during construction.

46. **DISEASE VECTOR CONTROL:**
The owner and/or operator of this MSWLF unit will prevent or control on–site populations of disease vectors using techniques appropriate for the protection of human health and the environment.

47. **PROHIBITED ACTS:**
The landfill will be operated and maintained to prevent open burning, scavenging, and the open dumping of waste.

48. **BUFFERS:**
This solid waste facility must provide a minimum 200 foot buffer between the waste disposal boundary and the property line and a minimum 500 foot buffer between the waste disposal boundary and any occupied dwelling and the dwelling's operationai private, domestic water supply well in existence on the date of permit application. No land disturbing activities are to take place in these buffers except for construction of groundwater monitoring wells and access roads for direct egress and ingress.

49. **LINERS AND LEACHATE COLLECTION SYSTEMS:**
This landfill unit shall be constructed with leachate collection systems designed and installed under the supervision of a professional engineer registered to practice in Georgia who shall certify the installation.
The liner and leachate collection system must ensure that the concentrations values listed in the table below in the uppermost acquifer at the relevant point of compliance.

Chemical	MCL (mg/L)	Chemical	MCL (mg/L)
Arsenic	0.05	Lindane	0.004
Barium	1.0	Lead	0.05
Benzene	0.005	Mercury	0.002
Cadmium	0.01	Methaxychlor	0.1
Carbon tetrachloride	0.005	Nitrate	10
Chromium (hexavalent)	0.05	Selenium	0.01
2, 4–Dichlorophenoxy acetic acid	0.1	Silver	0.05
1, 4–Dichlorobenzene	0.075	Taxaphene	0.005
1, 2–Dichloroethane	0.005	1,1,1–Trichloromethane	0.2
1, 1–Dichloroethylene	0.007	Trichloroethylene	0.005
Endrin	0.0002	2,4,5–Trichlorophenoxy acetic acid	0.01
Fluoride	4	Vinyl Chloride	0.002

The liner system consists of a 60 mil HDPE flexible membrane liner (FML) over a lower component of 24" of low permeability soil with a permeability at $1x10^{-7}$ cm/sec. The leachate collection system consists of an 8" perforated HDPE pipe and 24" protective cover with a permeability of $1x10^{-2}$ cm/sec. The system will maintain less than a 30 cm depth of leachate on the liner. The liner system has been designed and will be constructed to maintain a five (5) foot separation between the synthetic liner and the seasonal high groundwater elevation.

GEORGIA
Environmental Protection Division
Solid Waste Management Program
MINOR MODIFICATION APPROVAL
SOLID WASTE PERMIT NO. 040-008D (MSWL)
APPROVED BY: RJ DATE: 3/28/19

50. **RELEVANT POINT OF COMPLIANCE:**
The relevant point of compliance for this facility is no more than 150 meters from the waste management unit boundary and is located on land owned by the owner of the MSWLF unit. Factors taken into consideration for determining the relevant point of compliance are:
a. The hydrogeologic characteristics of the facility and surrounding land,
b. The volume and physical and chemical characteristics of the leachate,
c. The quantity, quality, and direction of flow of groundwater,
d. The proximity and withdrawal rate of the groundwater users,
e. The availability of alternative drinking water supplies,
f. The existing quality of the groundwater, including other sources of contamination and their cumulative impacts on the groundwater and whether groundwater is currently used or reasonably expected to be used for drinking water,
g. Public health, safety, and welfare effects, and
h. Practicable capability of the owner or operator.

51. **ACCESS ROADS:**
Access roads have been designed to provide for the orderly egress and ingress of vehicular traffic, when the facility is in operation, including during inclement weather.

52. **RUN–ON/RUN–OFF CONTROL:**
The Owner or operator must design, construct, and maintain a run—on control system to prevent flow onto the active portion of the landfill during the peak discharge from a 25–year storm. This is accomplished by berms and diversion ditches. A run–off control system from the active portion of the landiill must be designed, constructed, and maintained to collect and control at least the water volume resulting from a 24–hour, 25–year storm. This is accomplished by side slope drainage berms and downdrains, a perimeter ditching system, drainage pipes, and sediment/stormwater detention ponds. The run–off system must be designed in accordance with the surface water requirements listed below in paragraph 53.

53. **SURFACE WATER REQUIREMENTS:**
The MSWLF shall not:
a. Cause a discharge of pollutants into waters of the state or the United States, including wetlands, that violates any requirements of the Clean Water Act, including, but not limited to, the National Pollutant Discharge Elimination System (NPDES) requirements pursuant to section 402;

b. Cause the discharge of a nonpoint source of pollution to waters of the state or the United States, including wetlands, that violates any requirement of an area–wide or State–wide water quality management plan that has been approved under Section 208 or 319 of the Clean Water Act, as amended.

This is accomplished by the stormwater run–on and run–off control systems and erosion and sedimentation control devices that are designed, constructed, and maintained properly.

54. **CCR MANAGEMENT:**
The following plan is developed in accordance with the Georgia Rules for Solid Waste Management, 391–3–4–.07 (5):
(R) 1. **VOLUME AND DAILY CCR RECEIPT**

Estimated Total MSW, Annually	60,000 TONS
Estimated Total CCR, Annually	34,500 TONS
Estimated CCR, Daily	137 TONS
Estimated Maximum CCR, Daily	274 TONS

The facility will block dispose CCR, in a second working face as described previously in Paragraph 2, and does not plan to comingle the CCR with the other waste streams. The block disposal area will be entirely within existing Cells 10 and 11. If CCR tonnage increases to volumes that significantly change the annual tonnage, and prior to certification of any new disposal areas, an updated CCR Management Plan will be submitted to Georgia EPD for review and approval.

2. **PROCEDURES FOR WASTE PLACEMENT, COVER, AND RECOVERY.**
a) Working Face Management.
The block disposal of CCR will take place within Cells 10 and 11, and will require a second working face. CCR waste unloading shall be restricted to the working face of the CCR cell in such a manner that waste may be easily incorporated into the landfill with available equipment.

b) Waste Placement Procedures.
CCR shall be spread in uniform layers up to approximately 2 feet thick, and compacted to its smallest practical volume. Trucks bringing CCR waste to the CCR area will dump loads directly at the working face. Dozers or compactors will be used to spread, and compact the waste.

c) Daily Cover.
Approved daily cover shall be placed over the material disposed in the CCR area.

d) Working Face Size.
The working face must be maintained at a size that is compatible with the facility's available equipment for spreading and compacting waste, and for suppressing dust. The typical working face area will be 200 feet by 200 feet. However, occasionally the working face size may be adjusted to support unusual weather activity, temporary volume adjustments to the waste stream, to safely stage waste loads to accommodate truck traffic and allow disposal of waste loads during daily operations. The working face size may increase to a maximum of 350 feet by 350 feet. This maximum size will not persist for more than a day. Minimum equipment will include a dozer, compactor, and water wagon.

e) Inspection and Documentation.
The Operator will inspect the operations of the CCR disposal each day CCR is disposed at the working face. Details of the inspection, such as a checklist or notes, will be maintained in the Operating Record. The checklist will include confirmation of compliance with this approved Plan, and any recommended corrective action or changes to the plan.

f) Solidification.
This facility does not plan to utilize CCR waste for solidification.

g) Beneficial reuse.
There are currently no plans to recover the material for beneficial reuse. If these plans change, EPD must be notified prior to disturbing and excavating previously disposed CCR for beneficial reuse.

3. **FUGITIVE DUST CONTROL**
Potential CCR fugitive dust emissions originating from CCR disposal units, roads, conditioning areas, and other CCR management and material handling activities must be minimized. The following measures should be implemented to minimize CCR from becoming airborne at the facility:

a) Performance Standard.
The percent opacity from CCR and any other fugitive dust source listed in Air Quality Rule 391–3–1–.02(2)(n)1 shall not exceed the limits set therein. Percent opacity shall not equal or exceed 20 percent. The Operator will ensure that personnel are trained to properly recognize these limits, and may employ personnel with "Smoke School" training.

b) Control Measures.
The Operator will utilize measures to minimize the CCR from becoming airborne. These measures may be adjusted, daily if necessary, to compensate for changing weather and disposal conditions. The source CCR material is expected to be previously hydrated, which will reduce concerns of fugitive dust. At a minimum, the Operator will specifically:
– ensure all trucks transporting CCR will be covered
– reduce or halt operations during high wind events
– include passes with a water wagon in the disposal area
– apply more frequent cover as needed

In addition, the Operator may also add the following:
– add a water fogging system
– locate CCR inside an enclosure/partial enclosure
– reduce fall distances at material drop points
– use wind barriers, compaction, or vegetative covers
– establish vehicle speed limits
– pave and sweep roads

c) Site Conditions.
The Operator will keep a rain gauge on site, and monitor weather conditions. Operations will be adjusted to reflect the impact of weather conditions, volume of incoming waste, composition of incoming waste, changes in vehicular traffic patterns, and active working face locations.

Based on weather observations, the Operator may reduce or increase the use of water trucks and sprinklers accordingly to adjust to daily rainfall. If the Operator observes increase in wind speed or unusual gusting, hauling or disposal of CCR may be temporarily suspended to reduce fugitive dust. During extreme weather events, the Operator may temporarily cease operations until it is safe to resume activity.

An observation record will be maintained when fugitive dust emissions are observed. In addition, a daily observation report may be recorded and placed in the operating record. The facility may record these observations as part of the daily log or on separate forms. (*Sample form FDC1, is shown on Sheet 22A.*)

d) Moisture Content.
If the moisture content of the CCR material disposed at the working face is not sufficient for proper dust control during emplacement, the Operator will amend the material with water spray or other suppressants to minimize dust. Typically, a water truck will be used for conditioning for CCR material disposed at the working face, and will be performed within the active area. If the Operator observes fugitive emissions which exceed the performance standard listed in section 3.a, or based upon prior experience with the CCR material, the moisture content will be amended.

e) Citizen Complaints.
The Operator will keep a log at the landfill office to record citizen complaints. Personnel who answer the phones will be trained on how to properly record the complaint on previously prepared forms. At a minimum, the form will contain spaces to enter the date, time, name of the caller, and nature of the complaint. Copies of the logs will be added to the Operating Record on a regular basis. Corrective actions taken to resolve the complaint will be noted on the form in the space provided. Exact actions will depend on the nature of the complaint. (*A sample form, FDC2, is shown on Sheet 22A.*)

f) Annual Report.
An "Annual Fugitive Dust Control Report" will be submitted one year following the approval date of this plan, and on the same date on a yearly basis thereafter. The report shall include a description of the actions taken to control fugitive dust, a record of all citizen complaints, a summary of any corrective measures taken and, if applicable, recommendations to improve the dust control measures in the future. Observation records may be included in the Report.

4. **DESIGN CONSISTENCY**
I) Design Considerations.
The following landfill design considerations, analyzing the impact of block disposing the CCR, are included under separate cover in the design calculations that support this Plan. The attached document, "Report – Design Consistency; Crisp County US41S Landfill; Cordele, Georgia" by Smith + Gardner, Dated September 11, 2018 is a part of this CCR Management Plan:

a) Design Grade Stability.
The demonstration in the supporting design analysis evaluates the currently constructed Cells 10 and 11, of the Cells 1–16 permitted at the facility, and addresses Cap Stability, Base Liner Stability, and Slope Stability. The analysis shows that the influence of the CCR disposal on the previously assumed MSW waste properties is negligible. Consequently, the previous conclusions (that the landfill will be stable and provide appropriate factors of safety) still apply.

b) Chemical Resistivity of Liner.
Cells 10 and 11 have been constructed with a composite liner consisting of the following: 24 inches of on–site soils required to have a tested, in–place hydraulic conductivity of not more than 1×10^{-7} cm/sec, which is then overlain by a 60–mil HDPE Geomembrane. Based on the supporting evaluation, the leachate quality at the site will have no impact on the performance of the HDPE previously installed at the site.

c) Effects Of Cell Floor Settlement and Leachate Pipe Strength.
Similar to the stability demonstration presented in Item 4.a above, the supporting demonstration addresses the currently constructed Cells 10 and 11. The analysis by inspection shows that with an actual waste/cover density value that is lower than was assumed in the original analyses, these analyses are not only still valid, but are also somewhat conservative.

d) Functionality Of Leachate Collection and Removal System.
The demonstration in the supporting design analysis concludes that the LCRS is functioning as designed, and has had no impact due to receipt/disposal of CCR. The impact on the LCRS system would be expected to be low due to:

1. The vertical distance between the LCRS and the disposed CCR; and,
2. The relatively small quantity of CCR accepted and disposed in Cells 10 and 11 (about 2.7%).

e) Effects On Gas Collection System.
The facility does not currently have a gas collection system. The disposal area for the CCR material will be surveyed and recorded. Any future design of a gas collections system will be required to account for the location of the block of CCR material.

f) Construction Operation and Maintenance.
Construction, operation, and maintenance of waste units to be used for CCR disposal shall remain consistent with recognized and generally accepted good engineering practices for the maximum volume of CCR to be disposed.

The disposal cells at this facility have been and will be constructed by contractors with previous landfill construction experience. The cells have been and will be constructed in accordance with approved CQA standards for MSW landfill construction, and certified by professional engineers registered to practice in Georgia. The facility is operated by the County with properly trained personnel supervised by an Operator who maintains Georgia Landfill Certified Operator status. The facility maintains the necessary equipment for continuous operations, properly operating under the approved permit conditions.

g) Safety Emergencies.
The facility maintains a safety plan to cover operational procedures at the site. Personnel are trained to understand safety protocols. Types of emergencies which may be reported by site personnel are:
MEDICAL
FIRE
SEVERE WEATHER
EXPLOSIVE DEVICE THREAT
CHEMICAL SPILL
SLOPE FAILURE
EXTENDED POWER LOSS

Equipment operators and supervisors working on site have access to communication devices, including but not limited to, mobile phones and radios, which allow immediate notification of any emergency. Once a safety emergency is identified, proper steps will be taken to ensure the impact is minimized and the continued threat is eliminated as quickly as possible.

h) Leachate And Contact Water Management.
CCR will be disposed within lined areas, such that leachate produced within the area is collected through the leachate collection system. Any CCR waste, which is disposed in the MSW landfill, will not be placed on exterior slopes which are allowed to shed rainfall contact water directly into the stormwater management system. Exterior slopes constructed at final design grades will be covered with 12" of intermediate soil cover. Alternate daily cover is not permitted on final exterior slopes. The permitted design is intended to keep leachate generated prior to installation of final closure grades within the leachate collection system.

i) Professional Engineer Certification.
The report attached under separate cover, which details the calculations in sections a–e of Item 4.I) shall be signed and sealed by a professional engineer registered to practice in the State of Georgia.

II) CCR shall not be placed in any previously constructed cell, either comingled or as a monofill, without a demonstration that the cell, as constructed, was designed or can be retrofitted to accommodate CCR disposal. The demonstration for constructed cells is found in the report attached under separate cover. If CCR is disposed as a monofill within cells not currently constructed, the demonstration must be amended to show the design requirements are suitable.

5. **WASTE COMPATIBILITY ANALYSIS**
The CCR waste is compatible (non–reactive) with MSW or other waste streams received at the facility. Prior to disposal at the facility, the source of the CCR waste will be required to demonstrate the material is non–hazardous and passes a paint filter test, and provide TCLP test results.

a) Source(s) of CCR waste streams

The source of CCR waste is the coal–fired electric generating facility operated by the Crisp Power Commission. Any additional sources which generate CCR proposed for disposal will be submitted to EPD for approval prior to disposal.

(*continued on next sheet*)

LANIER ENGINEERING INC.
1504 W. THIRD AVENUE ALBANY, GEORGIA 31707
(229) 438-0522 FAX (229) 438-0921

REVISION HISTORY

DATE	DESCRIPTION
SEPTEMBER, 2000	ORIGINAL
APRIL 9, 2001	REVISED BY HHNT
JANUARY 27, 2009	REVISED PER C&D AREA
FEBRUARY 16, 2009	REVISED PER EPD'S C&D COMMENTS
MARCH 19, 2019 (R)	ADDED CCR MANAGEMENT PLAN

GEORGIA REGISTERED 3-19-19 NO. 23707 PROFESSIONAL ENGINEER JEFFREY M. BROWNE

DESIGN AND OPERATIONS PLAN
CRISP COUNTY US41S MSW LANDFILL
SITE #2 EXPANSION
PERMIT NO. 040–008D(MSW)
CRISP COUNTY, GEORGIA

BROWNE AND COMPANY, LLC
2719 Sheraton Drive • Building C, Suite 210
Macon, Georgia 31204 Ph/Fx: 478-743-4843
Browne and Company, LLC
PEF004508 Exp. 06/30/2020

SCALE	AS SHOWN
EDIT DATE	MARCH 19, 2019
PROJECT NUMBER	185–10–0104
SHEET NAME	OPERATIONS PLAN

(continued from previous sheet)

b) Chemical analyses of CCR waste streams

The CCR wastes acceptable for disposal at this facility consist of coal combustion residuals from a U.S. coal–fired generating facility which burned bituminous coal, sub–bituminous coal, or lignite. CCRs result from unburned carbon and inorganic materials in coals that do not burn, such as oxides of silicon, aluminum, iron, and calcium. CCR primarily consists of Fly Ash, Bottom Ash, Flue Gas Desulfurization (FGD) Residue [Gypsum], and Boiler Slag. Fly ash is the unburned material from coal combustion that is light enough to be entrained in the flue gas stream, carried out of the process, and collected as a dry material. Bottom ash is the unburned material that is too heavy to be entrained in the flue gas stream and drops out in the furnace. FGD Gypsum (Calcium Sulfate) has the same chemical properties as naturally occuring gypsym or hydrated calcium sulfate. Boiler slag is unburned carbon or inorganic material that does not burn, falls to the bottom of the furnace and melts. The chemical and physical properties may vary depending on the process used to improve air pollution control. Those CCRs, such as gypsum and some fly ash are in high demand for beneficial reuse and are not intended for disposal at this facility. However, excess or off–spec Gypsum or unburned coal not suitable for or intended for beneficial reuse may be disposed at this facility.

Specific analysis of the CCR source at the Crisp Power Commission facility is included in the "Report – Design Consistency" (Appendix C) attached under separate cover. TCLP analysis shows the constituents present, indicating the material is typical of CCR material. The material is acceptable at the Crisp County MSW Landfill.

c) Documentation of compatibility analyses for use in a solidification process

Material produced by the Crisp Power Commission is not intended for use in a solidification process. If such solidification is proposed for this facility, an appropriate application must be submitted if the process necessitates changes to the facility's design or operations.

6. **CLOSURE AND POST–CLOSURE IMPACTS.**
The closure and post–closure costs have been revised to reflect changes to the estimates. The original costs shown on Sheet 25 of 35 have been updated regularly, and the updated current cost tables are on file with Georgia EPD.

7. **GROUNDWATER MONITORING.**
The groundwater monitoring plan includes Appendix III and IV constituents (including boron) in accordance with 391–3–4–.14(21)(c) and 391–3–4–.14(25). The plan is shown on Sheets 31, 32, and 35, submitted to EPD for review with this plan.

8. **Modification Procedures.**
This CCR Management Plan must be modified and submitted for EPD's approval if changes in either operating procedures or the facility design are necessary to comply with the requirements for CCR management.

9. **Documentation of Notification to Local Governments.**
The owner or operator shall notify the local governing authorities of the county, and any city within the county, in which the landfill is located upon the initial submittal of a CCR Management Plan or upon submittal of an amended Plan to EPD. Copies of the correspondence to local governing authorities were attached to the submittal for this plan.

SAMPLE FORMS (R)

Operator may use copies of these sample forms or record the information on alternate forms.

Form FDC1 — **Observation Report**

SITE CONDITIONS — **Crisp County Landfill**

Intent: Potential fugitive dust emissions originating from CCR disposal activities, roads, conditioning areas, and other CCR management & material handling activities must be minimized. This form is a part of the CCR Management Plan.

1. *Reason for use*: Routine Daily Observation ☐ Emissions Observed ☐

If emissions were observed, complete the following information. Otherwise, continue to number 8.

2. **Date** and **Time** emissions were observed:

3. Person observing emission: | 4. Person completing this form:

5. Description of emission:

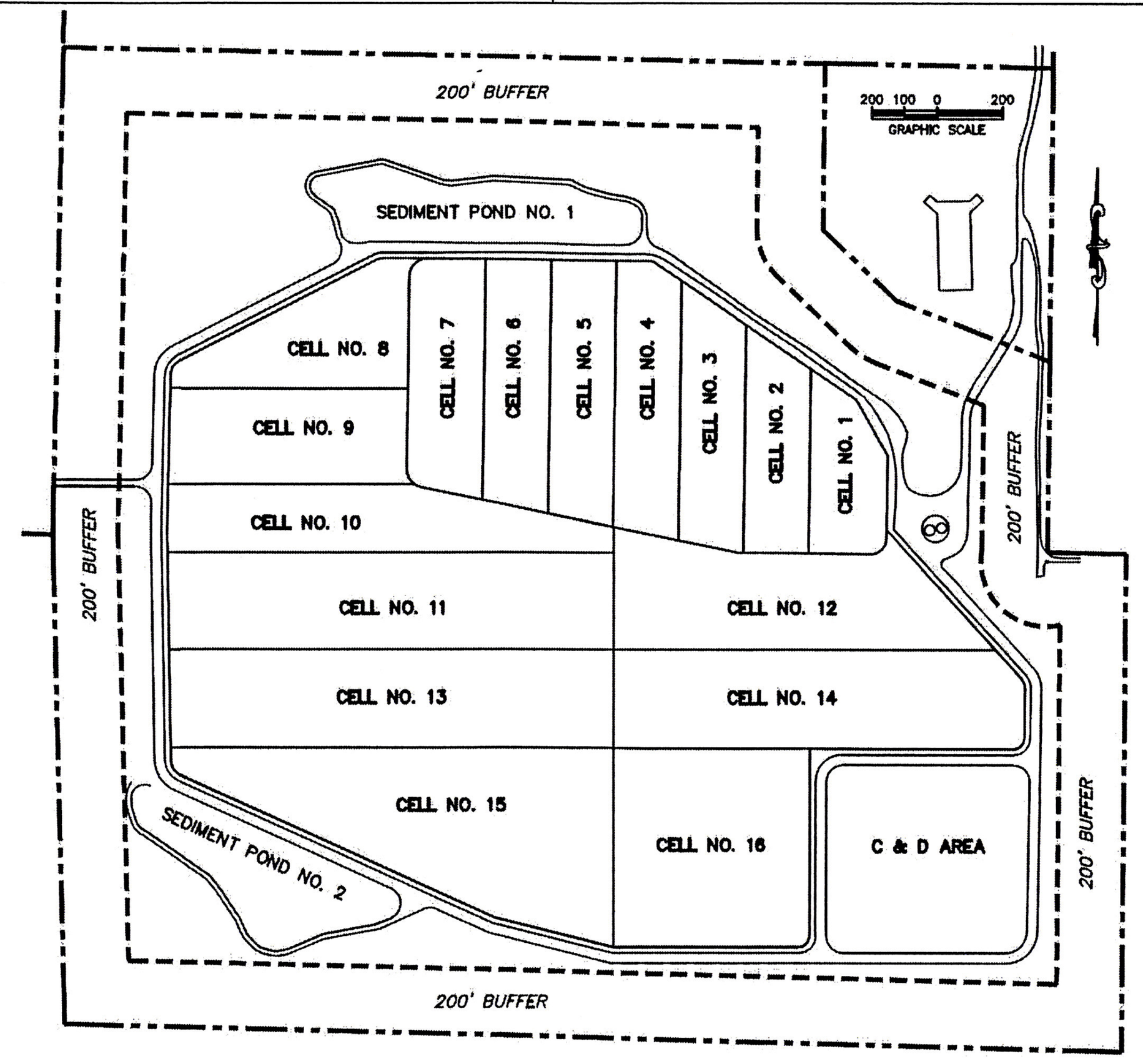
6. Area of site where emissions occurred: (*Mark an X on the figure below*)

7. Describe corrective actions taken or planned to be taken:

8. *Weather conditions* | Rain: | Wind: | Hot ☐ Mild ☐ Cool ☐ Cold ☐

9. Note any actions recommended for changes to operations to reduce emissions:

Today's Date: | Signature:



Form FDC2 — **Fugitive Dust Emissions**

CITIZEN COMPLAINTS — **Crisp County Landfill**

Intent: Potential fugitive dust emissions originating from CCR disposal activities, roads, conditioning areas, and other CCR management & material handling activities must be minimized. This form is a part of the CCR Management Plan.

1. *Reason for use*: Phone Call ☐ Site Visit ☐ *First Complaint from this Person?* Yes ☐ No ☐

2. **Date** and **Time** complaint received:

3. Person receiving complaint: | 4. Person making complaint:

5. Description of complaint:

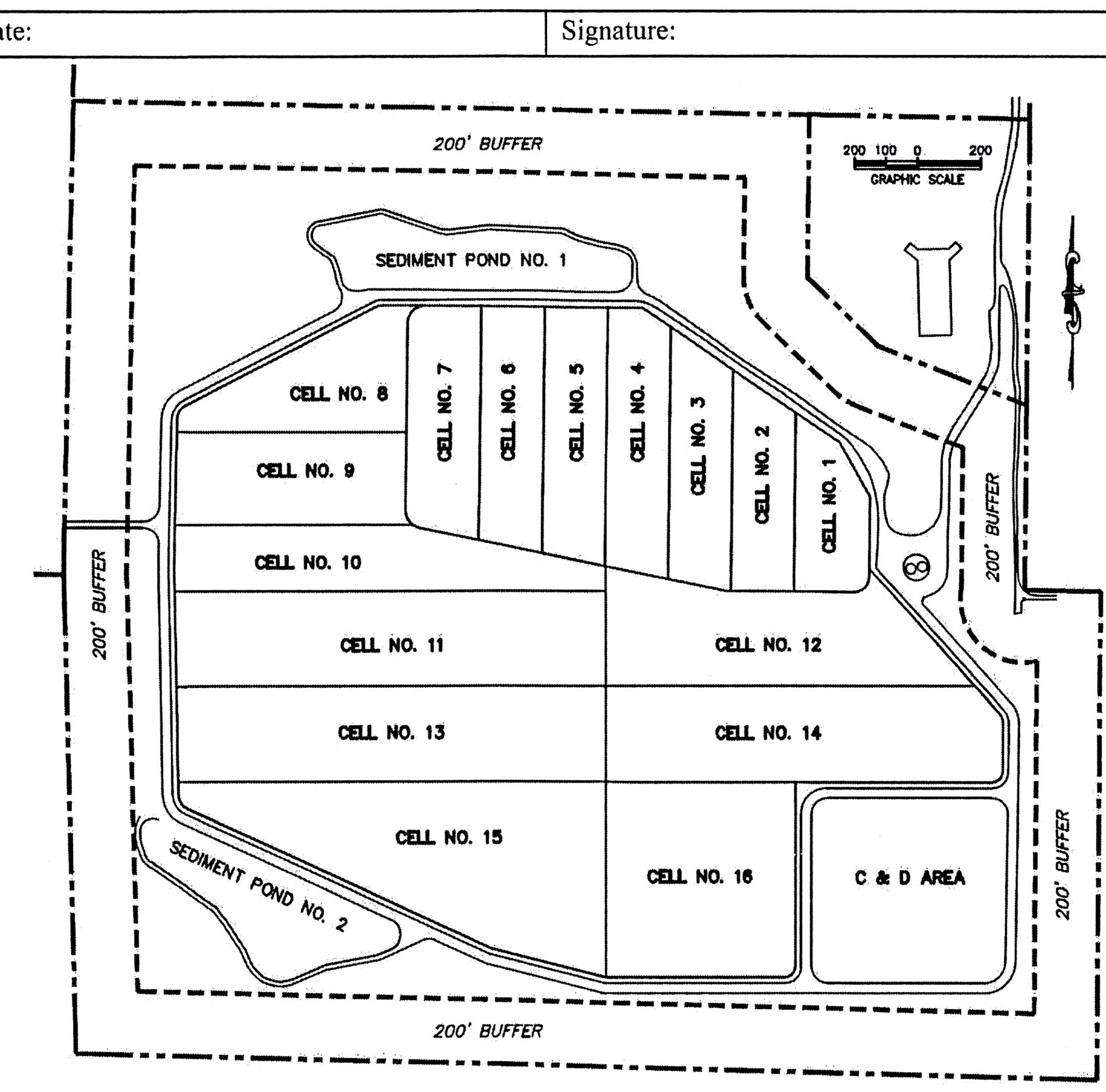
6. Area of site described in complaint: (*Mark an X on the figure below*)

7. Describe corrective actions taken or planned to be taken:

8. *Weather conditions* | Rain: | Wind: | Hot ☐ Mild ☐ Cool ☐ Cold ☐

9. Note any follow-up actions to be taken:

Today's Date: | Signature:



PROHIBITED WASTE EXCLUSION PLAN

1. **General**

Pursuant to the Rules for Solid Waste Management, Chapter 391–3–4–.07–(3)–(c)&(m), the Operator has developed this plan to exclude prohibited waste from being disposed at this facility. These prohibited materials include liquids, lead acid batteries, radioactive wastes, polychlorinated biphenyl (PCB) waste as defined in 40 CFR, Part 761, and regulated quantities of hazardous waste. It shall also be the policy of the Operator to identify quantities of hazardous waste below the regulatory threshold and to exclude these wastes also.

2. **Non–Conforming Waste Review**

In order to ensure that incoming loads do not contain prohibited wastes, personnel who are trained to recognize prohibited wastes will make random inspections, keep records of such inspections and notify the Director of the Georgia Environmental Protection Division if prohibited wastes are discovered at the facility. These procedures will be made a part of the operating record. The random inspections will be conducted at a minimum of every 4,000 tons of waste received or every ten (10) days.

Also, tipping area personnel trained to recognize prohibited wastes will be designated for the detection of non–conforming hazardous waste. They will observe each load as it is deposited on the tipping area. Records at each inspection will be made and kept as a part of the operating record. Liquid containers larger than 5 gallons in size which are not perforated and drained will be rejected. Likewise, pesticides, herbicides, lead acid batteries, biomedical waste, corrosives, and flammables will be rejected. If the non–conforming hazardous materials are delivered by a private hauler, the inspector will make a record of the materials and the hauler and report him to the Operator. Private haulers will be required to remove these materials from the facility.

The Operator will report the private hauler to the Georgia Department of Natural Resources Solid Waste Management Division. If the same hauler is caught for a second time, he will be banned from bringing any waste to the facility. If the culprit is not caught and identified, the cost of disposition of the waste will be borne by the Owner. The Operator intends to use a qualified hazardous waste handling company to properly dispose of any non–conforming materials that are brought to the facility. This waste will be immediately transported to an appropriate disposal facility.

In all cases, notification of the Director of the Georgia Environmental Protection Division will be made if a prohibited waste is discovered at the facility.

3. **Waste Acceptance or Rejection**

The acceptance or rejection of particular waste is based on the following factors:
* Federal, State and Local regulations, laws, or permit conditions
* Waste characteristics
* Operations and equipment limitations

Of these three items, the regulations, laws and permit conditions affect most of the waste excluded from this site. Wastes specifically excluded by these regulations, laws, and permit conditions include liquids, lead acid batteries, biomedical wastes, radioactive wastes, and regulated quantities of hazardous wastes.

a. **Liquid Waste Restrictions at Facility**

(1) Bulk or noncontainerized liquid waste will not be accepted.
(2) Containers holding liquid waste may not be accepted, unless:
  a. The container is a small container similar in size to that normally found in household waste;
  b. The container is designed to hold liquids for use other than storage; or
  c. The waste is household waste.
(3) For purposes of this section:
  a. "Liquid waste" means any waste material that is determined to contain "free liquids" as defined by Method 9095 (Paint Filter Liquids Test), as described in "Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods" (EPA Pub. No. SW–846).

b. **Lead Acid Batteries**

Lead Acid batteries are automobile type batteries. These items, whether from an automobile, a truck, a tractor, or other equipment are categorically excluded from this facility.

c. **Biomedical Waste**

Biomedical Wastes are any type of pathological waste, biological waste, cultures, infectious wastes, contaminated animal wastes, body parts, chemotherapy waste, discarded medical equipment and parts, and any other contaminated medical device. Disposal of this type of waste shall be limited to generators of less than 100 pounds per month from sources pre–approved by the operator. Sources generating more than 100 pounds per month are categorically prohibited from this facility.

d. **Radioactive Waste**

Radioactive waste is any material which exhibits radioactive characteristics. This waste is categorically prohibited from this facility.

e. **Hazardous Waste**

Hazardous wastes are those materials with characteristics, either physical or chemical, that could cause harm to health or the environment. A waste is hazardous if it is:
* Ignitable
* Corrosive
* Reactive
* Toxic (As defined by the TCLP test procedure)
* Is a listed hazardous waste

A waste material is ignitable if it has a flash point of 140°F or less, causes fire by friction under normal conditions, or is an oxidizer. Examples of ignitable waste include solvents, bottom material from solvent recovery, and peroxide. This waste is typically generated by automobile repair shops, machine shops, dry cleaners, and industry.

A waste is corrosive if the pH is 2 or less, or 12.5 or greater. An example of corrosive waste is spent pickle liquor from a metal plating operation or battery acid.

A waste is reactive if it is unstable under normal conditions, reacts violently with water, forms an explosive mixture with water, contains any quantity of cyanide, contains sulphur which could be released to the atmosphere, or can be easily detonated or exploded. Waste from certain chemical operations, munitions works, or fertilizer plants can be reactive.

A waste is toxic if it so tests by the TCLP procedure. The TCLP test stands for the Toxic Characteristics Leaching Procedure. For this test, a leachate is removed from the waste and the leachate is analyzed for specific constituents as listed in the Code of Federal Regulations, Chapter 40. If a waste checks toxic, then the waste is hazardous based on the TCLP test.

Toxic materials can cause cancer, birth defects, or illness if released to the environment. Examples of toxic waste includes solvents, industrial process sludges, emission control wastes.

A waste is characterized as a listed waste if it is listed in the Code of Federal Regulations, Chapter 40 or any amendments of this document. A typical listed waste is one in which the known characteristics of that material will likely endanger the health or environment. The exhaustive list of hazardous waste is in the Part 261, of Chapter 40 of the Code of Federal Regulations.

4. **Site Operations**

Recognition of these wastes by the operators is imperative. The operators of the facility have been trained to detect this material and call it to the attention of management. When material of this type is detected in the daily operation, the material is immediately segregated from the remainder of the waste stream and cordoned off. The hauler who delivered that waste to the facility is then notified to return to the facility and remove the material. All hazardous material inadvertently delivered to the facility is to be removed by the hauler within 24 hours.

5. **Waste Acceptance Protocol**
For generators or haulers with non–MSW waste, the generator will use a protocol for testing the special waste. The protocol is to be used for all special waste including industrial waste and contaminated soil. The protocol includes:

1. Perform the hazardous characteristics tests for ignitability, reactivity, corrosivity, and toxicity; if not eliminated by knowledge of the waste characteristics.
2. Test the material for PCB, TPH, and pH.
3. Report all testing to the Operator in original form signed by the Laboratory Principal.
4. Generator shall provide certification that test results are representive of the waste mass.
5. Provide a complete description of the waste.
6. Provide certification that the waste is Non–hazardous.
7. Provide estimates of waste volumes.

The Operator will review this data and either approve or disapprove acceptance of the waste stream. This procedure is valid for 12 months on each discrete non–MSW waste stream.

GEORGIA
Environmental Protection Division
Solid Waste Management Program
MINOR MODIFICATION APPROVAL
SOLID WASTE PERMIT NO. 040-008D(MSWL)
APPROVED BY: RN DATE: 3/28/19

RECEIVED
MAR 06 2019
SOLID WASTE MANAGEMENT PROGRAM

LANIER ENGINEERING INC.
1504 W. THIRD AVENUE ALBANY, GEORGIA 31707
(229) 438-0522 FAX (229) 438-0921

REVISION HISTORY

DATE	DESCRIPTION
SEPTEMBER, 2000	ORIGINAL
APRIL 9, 2001	REVISED BY HHNT
JANUARY 27, 2009	REVISED PER C&D AREA
FEBRUARY 16, 2009	REVISED PER EPD'S C&D COMMENTS
FEBRUARY 28, 2019 (R)	ADDED CCR MANAGEMENT PLAN

GEORGIA REGISTERED 2-28-19 NO. 23707 PROFESSIONAL ENGINEER JEFFREY M. BROWNE

DESIGN AND OPERATIONS PLAN
CRISP COUNTY US41S MSW LANDFILL
SITE #2 EXPANSION
PERMIT NO. 040–008D(MSW)
CRISP COUNTY, GEORGIA

BROWNE AND COMPANY, LLC
2719 Sheraton Drive • Building C, Suite 210
Macon, Georgia 31204 Ph/Fx: 478-743-4843
Browne and Company, LLC
PEF004508 Exp. 06/30/2020

SCALE	AS SHOWN
EDIT DATE	FEBRUARY 28, 2019
PROJECT NUMBER	185–10–0104
SHEET NAME	OPERATIONS PLAN AND PROHIBITED WASTE EXCLUSION PLAN

CLOSURE PROCEDURES

1. **GENERAL**
The owner of this disposal site shall close this site in a manner that minimizes the need for further maintenance and minimizes the potential of post–closure release of contaminants to the ground or surface waters. The closure plan considers partial or contingent closure of the landfill. Facility phasing drawings provide guidance on closure at the end of any cell. Should intermediate closure be required, all components of this plan should be followed.
2. **CERTIFICATION**
A Professional Engineer must certify that the site was closed in accordance with the approved Design and Operational Plan and the Rules for Solid Waste Management. Should the facility close prior to reaching permitted elevations the Engineers certification shall include an as–built plan.
3. **NOTIFICATION**
The owner shall notify the Environmental Protection Division of final closure within 30 days of receiving the final load of waste, providing E.P.D. with the date of final waste receipt and an accurate legal description of the boundaries of the landfill.
The Owner will complete all closure activities of each MSWLF unit in accordance with this Closure Plan within 180 days following the beginning of closure. See Closure Schedule below.
Signs shall be posted at the entrance gate notifying users of the closure. Upon closure, the property deed and legal description shall be filed at the county courthouse in accordance with O.C.G.A. 8–6–3. All deeds must be recorded and reported as outlined in the Georgia Rules of Solid Waste Management 391–3–4–.11(5).
4. **SURVEY CONTROL**
The complete legal description of the property is shown on the plans. All areas within which solid waste has been disposed shall be located to the best of the owner's ability and surveyed by a Registered Surveyor who shall provide a legal description of the waste management boundaries within 30 days of closure. Should partial closure occur, a topographic as–built survey of the site shall be developed.
5. **CLOSURE SUPERVISION**
Closure of the site shall be under supervision of the current landfill supervisor.
6. **DIRECTIONAL AND INFORMATIONAL SIGNS**
Signs shall be posted at the entrance gate notifying users of the landfill of the closure and providing the location of the nearest municipal solid waste landfill in the area. A telephone number for emergencies shall be printed on a sign [(912) 276–2657 d, (912) 273–4724 n].
7. **REMOVAL OF WASTES**
If the owner/operator of this facility wishes to remove wastes, waste residues or any contaminated soils, the owner/operator shall request and receive written approval from EPD prior to conducting any such activity.
8. **FINAL COVER**
Upon closure, all waste received at the site shall be spread, compacted and capped with the final cover system as described on the plans. Should the site be closed prior to attaining final grades, all uncovered and intermittently covered areas shall be capped with the system specified above. The final cap shall be placed within one month of the placement of solid waste in the lift. The minimum slope of the final cap shall be 3% and the maximum slope shall be 33%. One methane gas vent per acre shall be installed as shown on the detail sheet. Final cover shall be secured from on–site excavation of cell areas, stockpiles or other EPD approved borrow source areas as necessary.
The final cap system shall meet the following standards:
   a) The cover must be capable of preventing attraction of disease vectors, minimizing production of odors, and preventing blowing litter, and;
   b) Must be capable of completely covering the solid waste without change in the cover's properties by rain, heat, cold and other climatic conditions; and
   c) Must be substantially free of rock fragments that are greater than six inches in diameter.
   d) Must be capable of supporting the germination and propagation of vegetative cover.
   e) Must compact well and preclude the excessive infiltration of surface water.
9. **VEGETATIVE PLAN**
All disturbed areas shall be grassed and maintained in accordance with the following schedules. A vegetative cover shall be established within two weeks after final cover placement. Permanent covers which are slow to establish shall receive temporary seeding. The fertilizer requirements are suggested. The operator will submit soil samples to the County Extension Agent for analysis and determination of proper soil conditioners including lime. This analysis will become part of the operational records. Planting dates, fertilizer rates, and seeding rates shall meet the requirements in the Manual for Erosion and Sediment Control in Georgia.

SEEDS – PERMANENT	LBS/ACRE	DEPTH OF COVER	DATE OF PLANTING
BERMUDA, COMMON – HULLED	10	1/4" – 1/2"	2/15 – 6/30
BERMUDA, COMMON – UNHULLED	10	1/4" – 1/2"	10/1 – 3/1
BAHIA, PENSACOLA	60	1/4" – 1/2"	1/1 – 12/31

SEEDS – TEMPORARY	LBS/ACRE	DEPTH OF COVER	DATE OF PLANTING
MILLET, PEARL	50	1/4" – 1/2"	4/1 – 8/31
RYEGRASS, ANNUAL	40	1/4" – 1/2"	1/1 – 3/31 & 8/15 – 12/31

NOTES:
1. All seeding rates are pure live seed rates.
2. All seeding shall be mulched with clean dry hay at the rate of 2.5 tons per acre. Mulch shall be anchored by pressing the mulch into the soil immediately after the mulch is spread using a packer disk or disk harrow or equivalent piece of equipment.
3. Temporary seeding should also complement permanent seeding to produce a suitable cover while the permanent grasses germinate.
4. Undisturbed slopes greater than 3%, including soil stockpiles, are to be mulched immediately.

FERTILIZER REQUIREMENTS

TYPE OF SPECIES	YEAR	ANALYSIS OR EQUIVALENT N–P–K	RATE	N TOP DRESSING RATE
1. Cool season grasses	First	6–12–12	1500 lbs./ac.	50–100 lbs./ac.(1)(2)
	Second	6–12–12	1000 lbs./ac.	–
	Maintenance	10–10–10	400 lbs./ac.	30
2. Cool season grasses and legumes	First	6–12–12	1500 lbs./ac.	0–50 lbs./ac.(1)
	Second	0–10–10	1000 lbs./ac.	–
	Maintenance	0–10–10	400 lbs./ac.	–
3. Ground covers	First	10–10–10	1300 lbs./ac.(3)	–
	Second	10–10–10	1300 lbs./ac.(3)	–
	Maintenance	10–10–10	1100 lbs./ac.	–
4. Pine seedlings	First	20–10–5	one 21–gram pellet/seedling placed in closed hole	–
5. Shrub Lespedeza	First	0–10–10	700 lbs./ac.	–
	Maintenance	0–10–10	700 lbs./ac.(4)	–
6. Temporary cover crops seeded alone	First	10–10–10	500 lbs./ac.	30 lbs./ac.(5)
7. Warm season grasses	First	6–12–12	1500 lbs./ac.	50–100 lbs./ac.(2)(6)
	Second	6–12–12	800 lbs./ac.	50–100 lbs./ac.(2)
	Maintenance	10–10–10	400 lbs./ac.	30 lbs./ac.
8. Warm season grasses and legumes	First	6–12–12	1500 lbs./ac.	50 lbs./ac.(6)
	Second	0–10–10	1000 lbs./ac.	–
	Maintenance	0–10–10	400 lbs./ac.	–

(1) Apply in spring following seeding.
(2) Apply in split applications when high rates are used.
(3) Apply in 3 split applications.
(4) Apply when plants are pruned.
(5) Apply to grass species only.
(6) Apply when plants grow to height of 2"–4".

10. **SITE EQUIPMENT NEEDED**
The owner shall make adequate equipment available at the municipal solid waste landfill to ensure that closure requirements are executed correctly and efficiently. Should said equipment not be available, back up equipment may be obtained from the rental companies. Below is a minimum list of equipment which shall be required.
   A. Dozer/Compactor
   B. Scraper/Pan
11. **SEDIMENT REMOVAL**
Accumulated sediment shall be removed from drop inlets, drainage pipes, diversion ditches, and other drainage structures.
12. **EROSION AND SEDIMENTATION CONTROL**
Upon closure, all ditches, diversion berms, culverts, rip–rap, silt fence and other drainage structures serving disturbed areas, but not already built, shall be constructed and placed according to the Plan of Operation.
13. **COST OF CLOSURE**
(R) The estimated cost to close the largest area ever open during the active life of the MSWLF is approximately $4,414,856.25. This figure shall be updated on an annual basis, and submitted to EPD.
14. **COST LEGEND**
The following items were considered in the cost of closure for the site. The unit price of each item includes labor, materials, equipment, overhead and profit.

BASED ON THE LARGEST AREA EVER OPEN:

ITEM No.	ITEM	QTY.	UNIT	UNIT PRICE ($)	COST ($)
1.	6" Topsoil	43,000	C.Y.	3.25	139,750.00
2.	18" Cover Soil	129,000	C.Y.	3.25	419,250.00
3.	18" Compacted Soil Liner	129,000	C.Y.	5.25	677,250.00
4.	Geocomposite Geonet	2,313,500	S.F.	0.52	1,203,020.00
5.	40 mil FML	2,313,500	S.F.	0.38	879,130.00
6.	Grassing	55	Ac.	1,800.00	99,000.00
7.	Silt Fence	2,000	L.F.	3.00	6,000.00
8.	Stormwater Diversion Berm	28,000	L.F.	6.25	175,000.00
9.	Drop Inlet	37	Ea.	425.00	15,725.00
10.	Downdrain Construction	3,000	L.F.	25.00	75,000.00
11.	Methane Gas Vents	53	Ea.	3,000.00	159,000.00
12.	Sediment Basin Cleanout	4,000	C.Y.	3.00	12,000.00
13.	Final Disposal of Waste and Cleanup	1	L.S.	8,000.00	8,000.00
14.	Refuse Limits Survey	1	L.S.	6,500.00	6,500.00
15.	Engineering and CQA	1	L.S.	330,000.00	330,000.00
16.	Contingencies (5%)	1	L.S.	210,231.25	210,231.25
				TOTAL	$4,414,856.25 (R)

NOTES:
a) All costs shown include labor, materials and equipment and are based on Year 2019 costs.
b) The cost estimate equals the cost of closing the largest area of all MSWLF unit ever requiring a final cover at any time during the active life when the extent and manner of its operation would make closure the most expensive, as indicated by its closure plan.
c) The site will be filled in the following sequence: Cells No. 1, 2, 3, ... through Cell No. 17. When an area (either one or more cells) reaches final grade, and that area is a minimum or eight acres in size, the final cap shall be placed over that area.
Based on this sequencing, the worst case situation (maximum area unclosed at any time) will Cells No. 1 – 12 open (55 acres).
d) During the active life of the MSWLF unit, the owner and/or operator must annually adjust the closure cost estimate for inflation.
e) The number of methane gas vents can be reduced if gas generation and flow data can be submitted to EPD to substantiate fewer.

15. **LEGAL DESCRIPTION**

All that tract or parcel of land lying in or being in Land Lots 79 & 82, 10th Land District, Crisp County, Georgia, and being more particularly described as follows:

Beginning at the Southwest corner of Land Lot 79, being marked by a concrete monument found, said monument being the POINT OF BEGINNING;

THENCE North 01 degrees 12 minutes 16 seconds East for a distance of 1498.97 feet along the West Land Lot Line of Land Lot 79 to a point;

THENCE South 88 degrees 51 minutes 29 seconds East for a distance of 1077.85 feet to a point;

THENCE South 88 degrees 51 minutes 07 seconds East for a distance of 1252.73 feet to a point;

THENCE South 00 degrees 39 minutes 00 seconds West for a distance of 512.35 feet to a point;

THENCE South 46 degrees 06 minutes 00 seconds East for a distance of 312.24 feet to a point;

THENCE South 68 degrees 31 minutes 50 seconds East for a distance of 505.22 feet to a point;

THENCE South 00 degrees 38 minutes 40 seconds West for a distance of 586.09 feet to a concrete monument;

THENCE South 88 degrees 34 minutes 00 seconds East for a distance of 240.10 feet to an iron rear located on the East Land Lot Line of Land Lot 79 and Land Lot 82;

THENCE South 00 degrees 29 minutes 48 seconds West for a distance of 1527.05 feet along said Land Lot Line to a concrete monument;

THENCE North 88 degrees 33 minutes 10 seconds West for a Distance of 3234.32 to a concrete monument located on the West Land Lot Line of Land Lot 82;

THENCE North 01 degrees 26 minutes 50 seconds West for a distance of 1499.51 feet to a concrete monument, said monument being the POINT OF BEGINNING.

Said property contains 205.289 Acres.

16. **CLOSURE SCHEDULE**
Once the decision has been made by the Owner to close the landfill, the following schedule shall be followed over a 180 day period:
   1. Notify EPD of final closure within 30 days of receiving final load of waste.
   2. Provide EPD with the date of final waste receipt.
   3. Prepare accurate legal description of final waste management boundary.
   4. Prepare accurate legal description of entire property
   5. Prepare final topographic as–built survey if partial closure occurs.
   6. Post signs at entrance gate notifying users of closure and location of nearest MSWLF.
   7. Obtain written permission from EPD to remove waste, if required.
   8. Install final cover system.
   9. Initiate vegetative plan.
   10. Remove all accumulated sediments from ponds, ditches and other drainage structures.
   11. Construct all erosion and sediment control systems serving disturbed areas, but not previously built.
   12. Obtain certification from a registered professional engineer, licensed in the State of Georgia verifying that closure of each MSWLF unit has been completed in accordance with the Closure Plan.
   13. Notify EPD that this certification has been placed in the operating records.
   14. On all deeds of real property which has been used for landfilling, include notice of landfill operations, the date the landfill operation commenced and terminated, an accurate legal description of the actual location of the landfill, and a description of the type of solid wastes which have been deposited in the landfill.
   15. Submit to the Director of EPD confirmation that the information required in closure schedule item no. 14 above has been noticed on the property deed.
17. **WASTE INVENTORY**
The maximum inventory of wastes ever on–site over the active life of the MSW landfill facility is estimated to be 11,910,000 cubic yards. This estimate will be updated at the time of closure.
18. **METHANE GAS VENT TESTING**
One vent per cell shall be tested for the parameters listed in item 15, sheet 22 of 35, Operations Plan and Prohibited Waste Exclusion Plan.

POST–CLOSURE CARE PROCEDURES

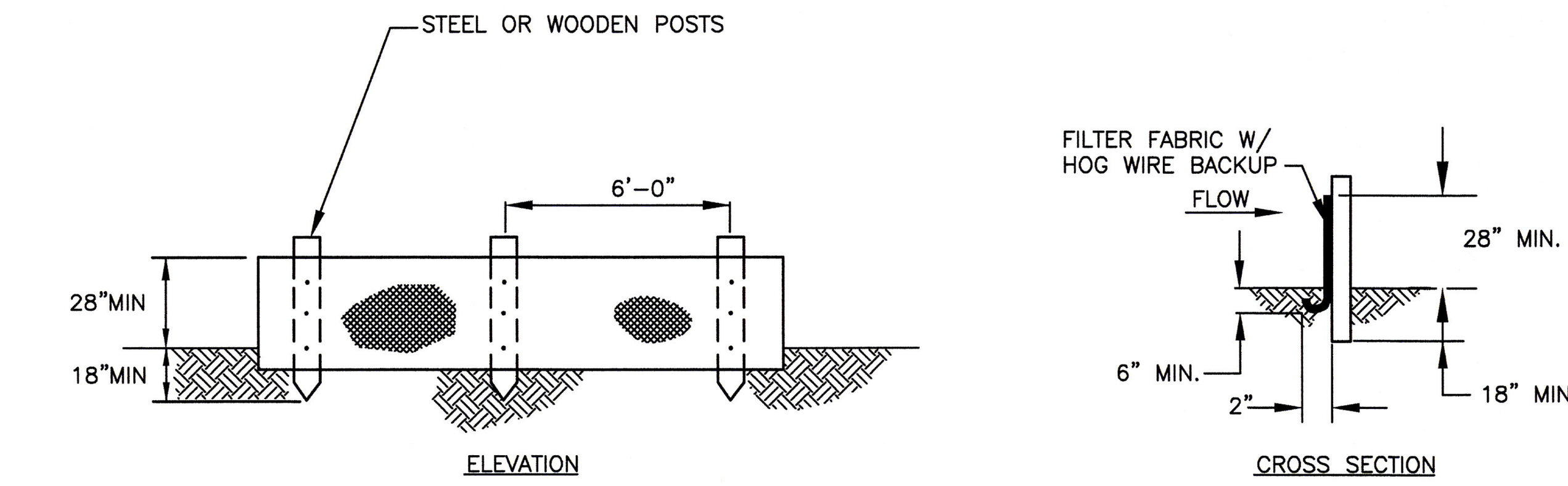
The owner of this disposal site shall conduct extended Post–Closure Care for at least 30 years after the completion of closure to adequately protect human health and the environment. Post–Closure shall consist of at least the following:

1. **POST–CLOSURE USE OF THE PROPERTY**
The owner shall ensure that post–closure use of property shall never be allowed to disturb the integrity of the final cover, liners, or any other components of the containment system or the function of the monitoring systems, unless the Environmental Protection Division determines that the activities are necessary to meet the requirements of chapter 391–3–4–.12. There is no planned use of this property during the Post–Closure Care Period at this time. Prior to any future use, EPD approval is required.
2. **WATER MONITORING**
Water monitoring, which includes groundwater and surface water, shall continue throughout the Post–Closure Care Period as described in the Operations Plan. The groundwater monitoring wells shall be maintained throughout this period. An analysis of the groundwater monitoring data shall be submitted to the Solid Waste Compliance Program at the Atlanta Office of EPD every five years after the site is closed. A recommendation of the next five years of post–closure care procedures shall be submitted with this report.
3. **METHANE GAS MONITORING**
Methane gas monitoring shall continue on a quarterly basis at points shown on the plans for as long as EPD deems necessary. Results shall be submitted to the Solid Waste Compliance Program at the Atlanta Office of EPD within 15 days. If methane gas concentrations are noted to exceed 25 percent of the lower explosive limit on the site in facilities or 100 percent at the property line, EPD shall be notified immediately and appropriate safety precautions and venting procedures shall be taken. On–Site methane vents will be inspected to insure they are operational. Testing of methane vents will continue as detailed on the plans.
4. **LEACHATE COLLECTION AND TREATMENT**
The leachate collection shall be maintained and shall collect leachate for a minimum of 30 years or until leachate does not provide a contamination threat. During the post closure care period sampling of the leachate shall continue as described in the approved design and operational plan. The storage and pumping systems shall be monitored with a high level alarm in the tank and an alarm in the secondary containment area which indicates a 6" liquid accumulation from precipitation or a leachate tank leak. These systems shall be maintained in good working order throughout the post closure care period. Leachate, collected during the post–closure care period, shall be disposed of in a POTW approved for this purpose.
5. **ROUTINE INSPECTION OF VEGETATIVE/FINAL COVER/DRAINAGE SYSTEM**
Throughout the Post–Closure Care Period, the site shall be inspected on a quarterly basis to ensure that all waste disposed of in the facility remains covered with a minimum of a 42" final cover system as shown on the closure plans. The repair work on the soil cover or synthetic cap liner shall meet or exceed the original construction requirements. Any areas noted to have less than the required cover from the effects of erosion, vehicular traffic, etc., shall have sufficient cover placed over them within ten working days. All areas lacking proper vegetation shall be grassed and maintained according to the vegetation and fertilization plans in this plan. Downdrain systems shall be maintained in proper working condition in accordance with the Plan of Operation.
6. **SEDIMENT BASIN MAINTENANCE/CLEAN–OUT**
Throughout the Post–Closure Period, all ditches, diversion berms, culverts, rip–rap, silt fence and other drainage structures shall be maintained according to the Operations Plan. Sediment ponds shall be cleaned upon the accumulation of the designed depth of silt within the pond. Erosion control structures shall be maintained so as to prevent damage to the final cover.
7. **LIMITED ACCESS**
Access to the site shall be controlled by fencing, gates, buffers, etc. Access shall be limited to those time periods when the site is undergoing maintenance activities.
8. **POST–CLOSURE SUPERVISION**
Post–Closure Care of the site shall be under the supervision of the current landfill supervisor. The person to contact about the facility during the Post–Closure Period is:
Landfill Operator
(912) 276–2657
9. **SITE EQUIPMENT**
The owner shall make adequate equipment available to the municipal solid waste landfill to ensure that Post–Closure Care requirements are executed correctly and efficiently. Rental equipment shall be utilized in the event that equipment dedicated to the municipal solid waste landfill should break down during Post–Closure Care procedures.
10. **DIRECTIONAL AND INFORMATIONAL SIGNS**
Signs shall be posted at the entrance gate notifying users of the landfill that the facility is closed and providing the location of the nearest municipal solid waste landfill in the area.
11. **REMOVAL OF WASTES**
If the owner/operator of this facility wishes to remove wastes, waste residue, or any contaminated soils, the owner/operator shall request and receive written approval from EPD prior to conducting any such activity.
12. **LEACHATE OUTBREAKS**
All leachate outbreaks and seeps shall be covered with a minimum of 12" of compacted soil and grassed in accordance with the Vegetative Plan.
13. **POST–CLOSURE CARE COST**
(R) The annual cost for Post–Closure Care of this site is approximately $84,840.00. This figure shall be updated on an annual basis, and submitted to EPD.

ITEM NO.	ITEM	QTY.	UNIT	UNIT PRICE ($)	COSTS ($)
1.	Water Monitoring Schedule				
	Groundwater	29	Ea./Yr.	600.00	17,400.00
	(Appendix III Groundwater)	7	Ea./Yr.	1000.00	7,000.00
	Surface Water	6	Ea./Yr.	450.00	2,700.00
2.	Methane Gas Monitoring	Total Site	Quarterly	800.00	3,200.00
3.	Methane Gas Samplling / Analysis	Total Site	Ea./Yr.	7,500.00	7,500.00
4.	Erosion & Sedimentation Controls including repair of final cap and slope failures	Total Site	L.S.	15,000.00	15,000.00
5.	Sediment Basin Maintenance/ Cleanout	4,000	C.Y.	3.00	12,000.00
6.	Engineering Inspections	4	Quarterly	1,500.00	6,000.00
7.	Leachate Collection, Treatment & Analysis	1	L.S.	10,000.00	10,000.00
8.	Contingency (5%)	1	L.S.	4,040.00	4,040.00
		Total Yearly Post–Closure Cost			$84,840.00
		Thirty–year Post–Closure Cost			**$2,545,200.00** (R)

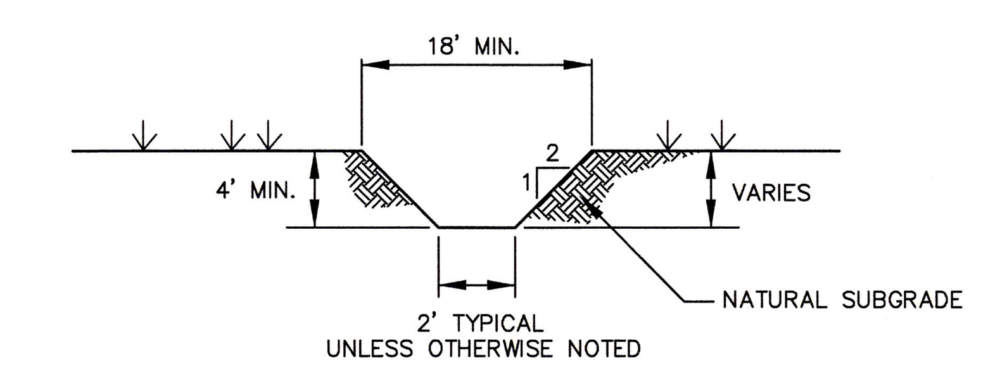
NOTES:
a) This post–closure cost is based on year 2019 costs.
b) All costs shown include labor, materials and equipment.
c) Cost of water & gas monitoring is based on current costs for these services. Cost of groundwater monitoring includes additional cost for monitoring those groundwater wells requiring analysis of Appendix III parameters, in accordance with the CCR Management Plan.
d) Methane Gas Monitoring includes sampling and analysis of gas from one methane gas vent per cell as described on the plans.
e) During the active life of the MSWLF unit and during the post–closure care period, the owner and/or operator will annually adjust the post–closure cost estimate for inflation.
f) The above cost estimate is based on the most expensive costs of the post–closure care during the post–closure care period.
g) Item no. 4 above is based on a contract cost to repair one slope failure per year ($8,000), and replace soil and regrass one acre per year ($3,500). Also, a cost for engineering on these corrections ($3,500) is included.

14. **NOTIFICATION OF MONITORING STANDARDS EXCEEDED**
The owner and/or operator shall be responsible for conducting all monitoring activities. If at any time the monitoring results indicate exceeding of established standards or indicate a threat to human health or the environment, the Owner and/or operator shall notify the Environmental Protection Division within 5 days of such determination and shall provide a plan for remediation within 30 days of such notice. The plan shall be submitted to the Director of the Environmental Protection Division for approval. Unless notified otherwise by the Division within 30 days of receipt of a complete plan, the plan shall stand approved. Upon approval, the owner and/or operator shall implement the approved plans.
15. **CERTIFICATION**
Following the closure of all MSWLF units, a professional engineer registered in the State of Georgia, will certify that the post–closure care was completed in accordance with the post–closure care plan and the certification was placed in the operating record.



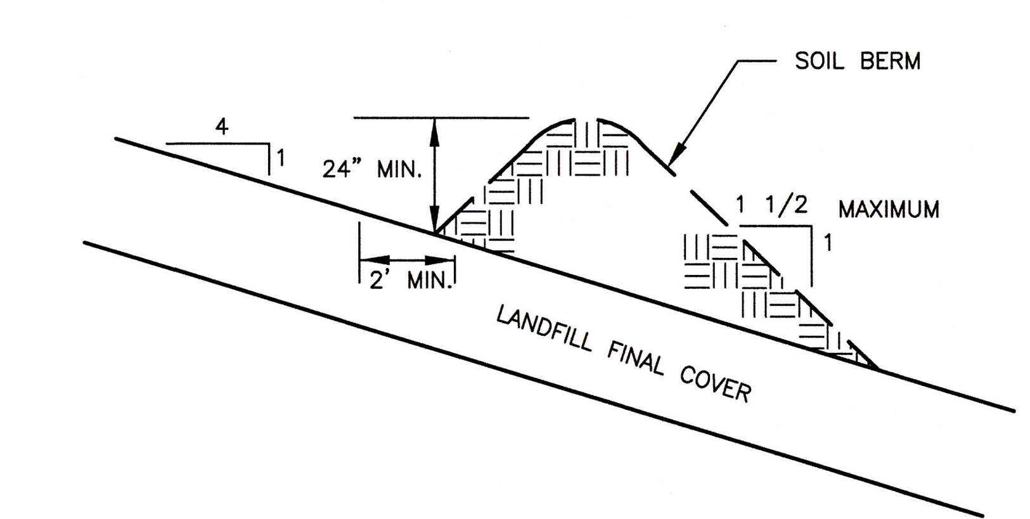
NOTES:
1. FLOWS MAY NECESSITATE THE PLACEMENT OF HAY BALES IN FRONT OF FILTER FABRIC
2. THE FILTER FABRIC SHALL BE CHOSEN FROM THE GEORGIA DEPARTMENT OF TRANSPORTATION LIST #36.
3. SILT FENCE SHALL BE CLEANED OF SEDIMENT WHEN LESS THAN 1/2 OF SURFACE AREA IS SHOWING.

SILT FENCE

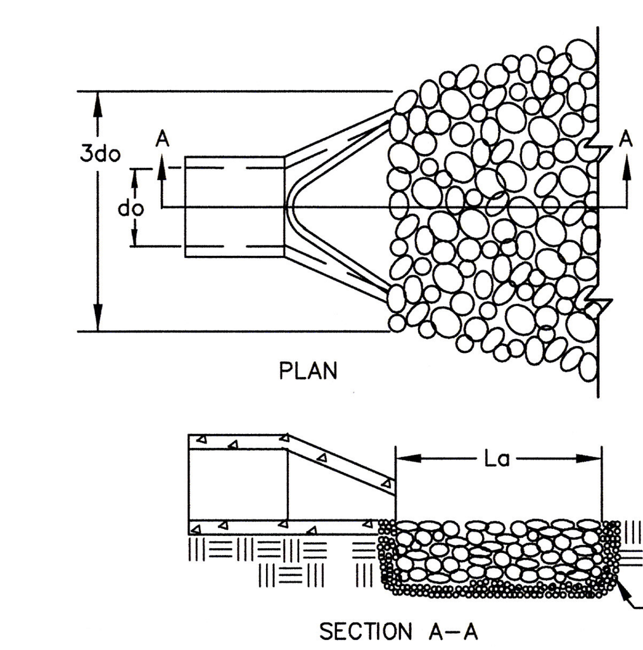


DRAINAGE DITCH SECTION

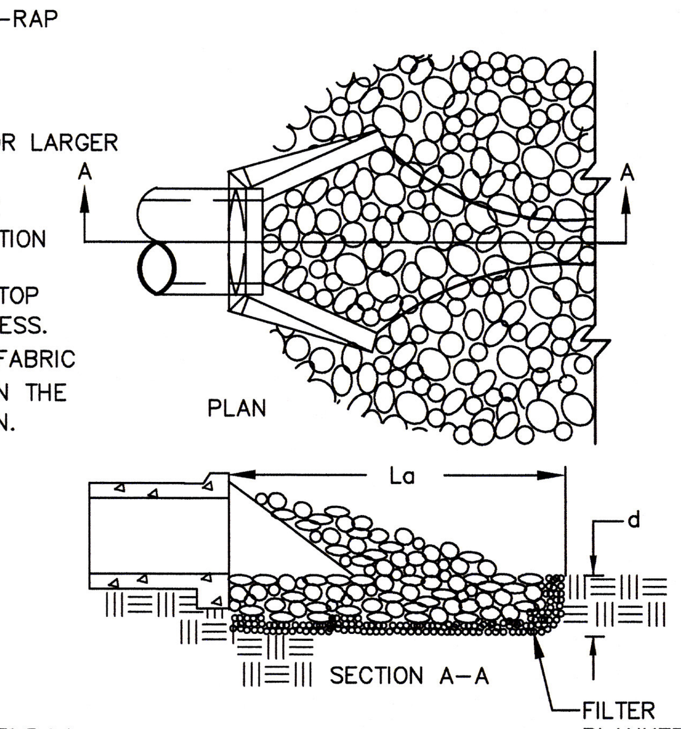
NOTE: SIDE SLOPE BERMS TO BE CONSTRUCTED WITH END LOADERS AND SIMILAR EQUIPMENT IN CONJUNCTION WITH INDIVIDUAL CELL CONSTRUCTION.



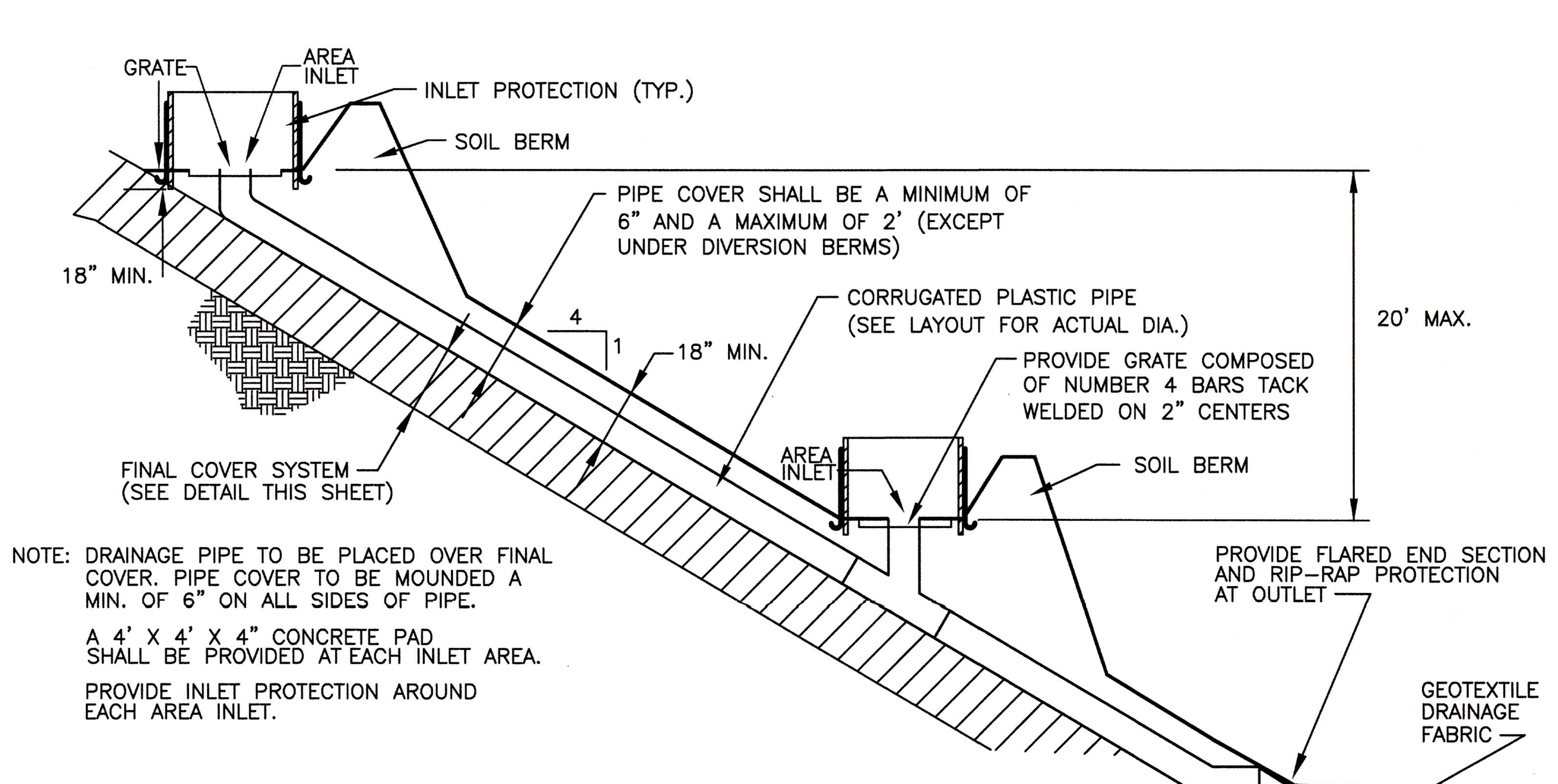
LANDFILL SIDE SLOPE BERM



NOTES:
1. La IS THE LENGTH OF THE RIP–RAP APRON.
2. 12" THICK FOR 6" RIP–RAP
18" THICK FOR 9" RIP–RAP
24" THICK FOR 12" RIP–RAP OR LARGER
3. IN A WELL–DEFINED CHANNEL, EXTEND THE APRON UP IN THE CHANNEL BANKS TO AN ELEVATION OF 6" ABOVE THE MAXIMUM TAILWATER DEPTH OR TO THE TOP OF THE BANK, WHICHEVER IS LESS.
4. A FILTER BLANKET OR FILTER FABRIC SHOULD BE INSTALLED BETWEEN THE RIP–RAP AND SOIL FOUNDATION.

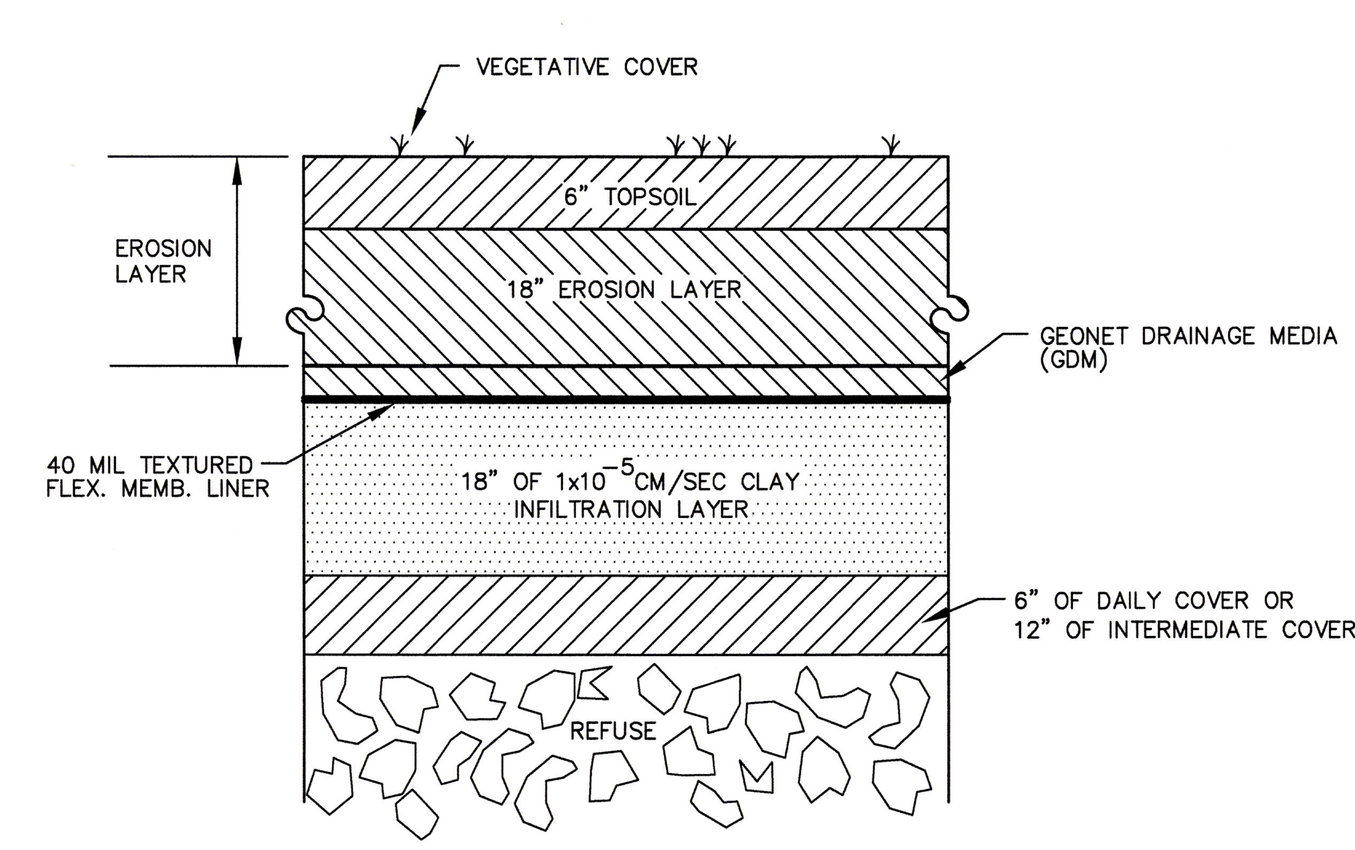


OUTLET PROTECTION

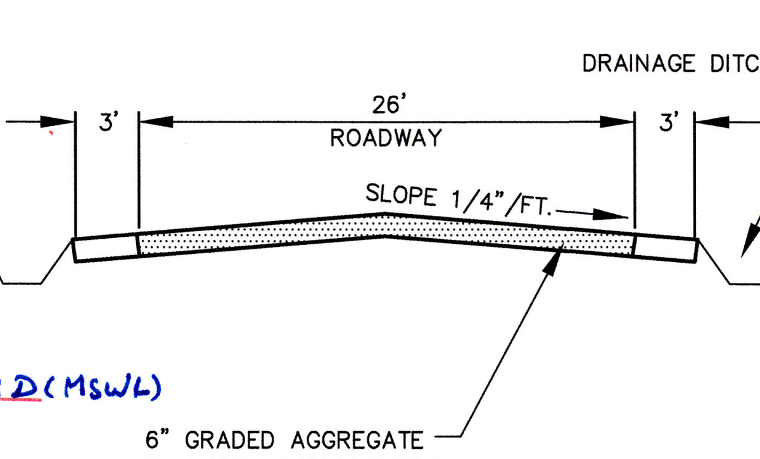


NOTE: DRAINAGE PIPE TO BE PLACED OVER FINAL COVER. PIPE COVER TO BE MOUNDED A MIN. OF 6" ON ALL SIDES OF PIPE.
A 4' X 4' X 4" CONCRETE PAD SHALL BE PROVIDED AT EACH INLET AREA.
PROVIDE INLET PROTECTION AROUND EACH AREA INLET.

AREA INLET DOWNDRAIN



FINAL COVER SYSTEM



GEORGIA
Environmental Protection Division
Solid Waste Management Program
MINOR MODIFICATION APPROVAL
SOLID WASTE PERMIT NO. 040-008D (MSWL)
APPROVED BY: RJ DATE: 3/28/19

RECEIVED
MAR 26 2019
SOLID WASTE MANAGEMENT PROGRAM

ALL WEATHER ACCESS ROAD SECTION

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REVISION HISTORY

DATE	DESCRIPTION
SEPTEMBER, 2000	ORIGINAL
MARCH 20, 2001	REVISED BY HHNT
MARCH 19, 2019 (R)	REVISED PER EPD COMMENTS

GEORGIA REGISTERED PROFESSIONAL ENGINEER NO. 23707 JEFFREY M. BROWNE 3-19-19

DESIGN AND OPERATIONS PLAN
CRISP COUNTY US41S MSW LANDFILL
SITE #2 EXPANSION
PERMIT NO. 040–008D(MSW)
CRISP COUNTY, GEORGIA

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Browne and Company, LLC
PEF004508 Exp. 06/30/2020

SCALE	AS SHOWN
EDIT DATE	MARCH 19, 2019
PROJECT NUMBER	185–10–0104
SHEET NAME	CLOSURE / POST–CLOSURE CARE PLAN

I. INTRODUCTION

Groundwater and Surface Water Quality Monitoring is required by the Georgia Environmental Protection Division (EPD) to detect and quantify contamination, as well as to measure the effectiveness of engineered disposal systems. A Groundwater and Surface Water Monitoring Network for this site has been designed to provide an early warning of disposal system failure. This plan defines the parameters for analysis, frequency of collection, procedures and techniques for sample collection, sample preservation and shipment, analytical procedures and chain of custody control. This plan conforms to the EPD's Manual for Groundwater Monitoring but also incorporates more recent guidance, where noted. Groundwater and Surface Water sampling locations are depicted on sheet 35 and tabulated in Section IV of this Plan.

II. WATER MONITORING NETWORK DESIGN

Geologic conditions for this site are described in the "Report of Site Hydrogeologic Assessment for Landfill Expansion, Crisp County Municipal Solid Waste Landfill, Crisp County, Georgia" dated October 21, 1999 and prepared by Bunnell-Lammons Engineering, Inc. (BLE project number J98-1238-01). The original groundwater monitoring plan was based on the site-specific data in that report and included installation of wells in phases. At this time, however, all phases have been completed and the entire monitoring network is installed.

III. GROUNDWATER MONITORING WELL SPECIFICATIONS

Groundwater Monitoring Wells must be installed under the supervision of a Professional Geologist or Professional Engineer. The Geologist or Engineer will certify to the Georgia EPD that the monitoring wells have been constructed, developed, and, if required, abandoned according to this plan and the "Manual for Groundwater Monitoring, September, 1991" or any superseding guidance required by the Rules for Solid Waste Management. Any drilling contractors installing monitoring wells at this facility must have a valid and current bond with the Georgia Water Well Standards Advisory Council. Drilling methods will be chosen based on location-specific conditions and in accordance with EPA guidance document SESDGUID-101-R1. The drilling method shall minimize the disturbance of subsurface materials and shall not cause contamination of the groundwater. Regardless of the drilling method selected, drilling equipment shall be steam cleaned before use and between borehole locations to prevent cross contamination of wells. Specifications for construction of monitoring wells are detailed in the following sections:

A. Monitoring Well Construction Materials

Well construction materials shall be sufficiently durable to resist chemical and physical degradation and yet not interfere with the quality of groundwater samples. Materials to be used for well casings, well screens, filter packs, and annular seals are covered in this section.

Well Casings and Screens - ASTM, NSF-rated, schedule 40, 2-inch PVC with flush threaded connections shall be used for the casing and well screens. It is understood that since PVC pipe is being selected for casing and screening material there may be the possibility that after installation PVC deteriorating compounds could be present in the groundwater. If these compounds are detected, then EPD must assume that the contaminants are from the sanitary landfill and not from the well casing or screen unless identical compounds are found in the upgradient wells and can not be attributed to wastes placed in the site.

Well Intake Design - The design and construction of each monitoring well should:

1. allow sufficient groundwater flow to the well for sampling,
2. minimize the passage of formation material into the well, and
3. ensure sufficient structural integrity to prevent collapse of the intake structure.

The intake of each monitoring well will consist of screen or slotted casing with openings sized to minimize the potential for formational material passing through the well during development or sampling. For quality-control purposes, only commercially manufactured screens or slotted casings shall be used. Field slotting of screens is unacceptable. Screen size will be selected to retain 90% of the filter pack. Screens with 0.010 inch slots shall be used unless geologic conditions discovered at the time of installation dictate a different size. Screen length shall not exceed 10 feet without ample justification. A flush threaded end cap with sump (3-6 inches long) will be installed at the bottom of the screen. A clean, securely fitting cap will be placed on the top of the casing and a 1/4-inch vent hole drilled into the casing below the cap to allow pressure in the well to equilibrate with atmospheric pressure as water table levels change.

Filter Pack and Annular Sealant - the materials used to construct the filter pack will be chemically inert clean quartz 20-40 sand brought to the well location in factory sealed bags. To ensure discrete sample horizons, the filter pack will extend no more than two feet above the well screen. If geologic conditions at the time of drilling dictate the need for a different filter pack size, a sieve analyses of the formation materials will be used to determine filter pack size and documentation must be provided to the EPD. Filter pack materials should be placed in the well through tremie pipe unless the supervising geologist or engineer approves an alternate method based on actual conditions.

The materials used to seal the annular space must prevent cross contamination between strata. The materials should be chemically resistant to ensure seal integrity during the life of the monitoring well and chemically inert, so they do not affect the quality of the groundwater samples. A minimum of two feet of certified coarse grit sodium bentonite will be placed immediately over the filter pack and below the frost zone. Any annulus remaining above the bentonite seal and below the frost zone will be filled with a non-shrink type i cement and bentonite mixture (3-6% bentonite). Annular sealant materials should be placed through tremie pipe unless the supervising geologist or engineer approves an alternate method based on field conditions. Bentonite installed above the water table will be hydrated with potable water.

Extending from a little below the frost line to the surface, the remaining annulus will be filled with concrete as part of the surface completion described in the following section. Locating the interface between the concrete and annular sealant 1/2 to 1 foot below the frost line serves to protect the well from damage due to frost heaving.

Well Surface Completion - a concrete well pad and locking steel or aluminum well cover will be installed after construction of the subsurface well components to protect the well from damage and unauthorized access, minimize vegetation and infiltration around the well, and provide a working surface for future sampling activities.

The locking, well cover (vented) will be placed over the well casing such that the top of the well casing is approximately ½ to 1-inch below the open edge of the locking cover and the bottom of the locking cover is approximately 1-foot below grade and concreted into the well pad. The inside of the well cover will be filled with pea gravel up to the vent hole in the well casing. The pea gravel should be installed such that the well casing is centered in the well cover when finished. A ¼-inch weep hole will be installed in the well cover just above the well pad to drain any liquids that may build up inside the well cover. Care must be taken when installing the weep hole to avoid penetrating the well casing. 2-inch or larger lettering will be added to the well cover to allow easy identification of the well designation. Alternatively, a separate marker post may be installed to display the well designation.

The well pad will be a minimum of 4-inches thick and extend outward at least three feet from the center of the well casing. The pad will be constructed with poured concrete and mounded to drain water away from the well. A survey pin will be installed in the concrete as a reference point.

Following construction of the pad, a survey will be will be completed by a georgia-registered land surveyor to establish the locations and elevations of the survey pin and the top of the well casing.

B. Well Development

Following construction, monitoring wells will be developed to create an effective filter pack around the well screen, to rectify damage to the formation caused by drilling, to remove fine particles from the formation near the borehole, and to assist in restoring the natural water quality of the aquifer in the vicinity of the well. Well development procedures will conform to EPA guidance document SESDGUID-101-R1.

Development stresses the formation around the screen, as well as the filter pack, so that mobile fines, silts, and clays are pulled into the well and removed. The process of developing a well creates a graded filter pack around the well screen. Development is also used to remove any foreign materials (drilling water, muds, etc.) That may have been introduced into the well borehole during drilling and well installation. The development of a well is extremely important to ensuring the collection of representative groundwater samples.

When development is initiated, the well typically produces very turbid water. However, as pumping continues, and the natural materials are drawn into the filter pack, an effective filter will form through a sorting process. Inducing movement of groundwater into the well (i.e., in one direction) generally results in an unstable bridging of the particles that can be easily disturbed during subsequent sampling activities. Wells must be surged to break down the initial bridges and produce a stable filter. A surge block or equivalent mechanism will be used to surge the well during development. The following is a general procedure for developing a well by surging and pumping of fines:

1. Record the static water level and total well depth.
2. Surge the entire well screen for at least 5 minutes.
3. Lower the pump to the bottom of the well and pull back up approximately one foot before activating to minimize clogging.
4. Pump water from the well while moving the pump up and down over the entire well screen, taking care to remove sediments from the well sump. Record volume of water removed.
5. Continue pumping until water clears noticeably.
6. Repeat steps 2-5 until surging produces a minimal change in turbidity.
7. Decrease the pump flow rate to minimize drawdown of the well and begin recording the field parameters pH, specific conductance, and turbidity.
8. Continue pumping until field parameters stabilize and turbidity is below 10 N.T.U. Stabilization occurs when, for at least three consecutive measurements, the pH remains constant within 0.1 standard unit (SU) and specific conductance varies no more than 5 percent.
9. Record the final water level and well depth.

Should a well be constructed in low yielding water-bearing formations, an outside source of water may be introduced into the well to facilitate development. In these cases, the water shall be chemically analyzed to ensure that it cannot contaminate the aquifer. If compressed air is used in the development of wells there is the possibility that trace contaminants may be introduced. Therefore, sufficient precaution shall be taken to prevent introduction of contaminants which may be cause of concern. All equipment used to develop a well shall be cleaned prior to its introduction into the well.

If turbidity remains above 10 N.T.U. after 8 hours of development, the supervising geologist or engineer must evaluate the development method and either modify the method to achieve better results or certify that the final turbidity is the best achievable given the geologic conditions in which the well is screened

Redevelopment - Changes in subsurface conditions over time may cause turbidity levels to increase in properly developed wells. In these cases, wells should be redeveloped in accordance with the above procedures. If turbidity can't be reduced to acceptable levels, replacement of the well should be considered.

C. Documentation

Within 30 days following completion of well development and receipt of surveying data, the following information will be submitted to the Georgia EPD. The information will be submitted in report form, signed and sealed by the registered geologist or geotechnical engineer who provided oversight of the installation project and including a discussion of any deviations from this plan.

1. Names of drillers, identification of drilling rig;
2. Copy of driller's bond;
3. Date/Time of construction;
4. Drilling method and drilling fluid * (primarily drilling mud) used;
5. Well location (+0.5 ft.);
6. Borehole diameter and well casing diameter;
7. Well depth (+0.1 ft.);
8. Drilling and lithologic logs;
9. Casing materials *;
10. Screen materials and design;
11. Casing and screen joint type;
12. Screen slot size/length;
13. Filter pack material*/size;
14. Filter pack volume;
15. Filter pack placement method;
16. Sealant materials *;
17. Sealant volume;
18. Sealant placement method;
19. Surface seal design/construction;
20. Documentation of well development procedures and readings;
21. Type of protective well cap;
22. Ground surface elevation (+0.01 ft.);
23. Top of casing elevation (0.01 ft.); and
24. Detailed drawing of well (include dimensions).

*samples of materials, adequate for leaching/ sorption tests should be retained.

D. Abandonment

All borings within the waste footprint have been abandoned prior to this revision and, therefore, only a procedure for abandoning borings outside the waste is required for this facility.

Should it become necessary to abandon any groundwater or methane monitoring well, soil boring, piezometer or similar subgrade void located outside of the waste footprint, the following steps will be taken;

1. Removal of obstructions in the well that could interfere with the plugging operation.
2. Removal of the well casing (where practical) to ensure placement of an effective seal - as a minimum when the casing is not properly grouted, the upper 20 feet of casing must be removed.
3. Sealing of the well with an impermeable filler such as neat cement and/or bentonite clay.

These actions will be supervised and documented by a Georgia Registered Geologist or Engineer.

IV. SAMPLING AND ANALYSIS PLAN

Following EPD-approval of groundwater monitoring well construction, sampling of the water monitoring network will be initiated on a semi-annual basis. Samples will be collected and analyzed as detailed in this plan and in general accordance with the EPD's Manual for Groundwater Monitoring and the USEPA Region IV, Science and Ecosystem Support Division Operating Procedure titled "Groundwater Sampling" (SESDPROC-301-R4). Field books or an equivalent method will be used to record daily instrument calibration, well conditions, and other notes, along with sampling parameters including depth to water, water quality parameters, purge and sample times, and analytical requirements.

Groundwater Elevations - during each water monitoring event and prior to purging groundwater monitoring wells, field personnel will measure and record the depth to the water surface in the well from the top of the well casing using a clean, properly decontaminated electric water level indicator capable of reliably measuring depths to the nearest 0.01 feet. Measurements should be collected from all site wells within a 24-hour period. The depth to water measurements will be used with top of casing elevation to calculate the groundwater elevation. Groundwater elevations will be used to construct a potentiometric map and determine if flow gradients have changed from those used to design the current water monitoring plan. Should a change be indicated, this water monitoring plan will be revised as needed to incorporate the changed hydrologic conditions.

Groundwater sampling at this facility will be completed using dedicated bladder pumps (or peristaltic pumps) and a low-flow purging and sampling protocol as detailed in SESDPROC-301-R4. Dedicated stainless steel impeller pumps may be used for excessively deep wells. Low-flow procedures with dedicated equipment allow for collection of more representative samples than can be obtained using bailers. This is primarily achieved by reducing agitation within the aquifer to minimize turbidity and at the sample point to minimize volatilization. The reduced chance for sample contamination when using dedicated equipment also makes samples more representative of actual groundwater conditions.

Pumps and tubing will be constructed of inert materials and positioned such that the pump intake is approximately in the middle of the well's screened interval. Pumps will be decontaminated prior to installation and placed carefully in the well to avoid introducing contamination.

A multi-volume purging/sampling protocol using appropriate pumps or disposable bailers (in accordance with the EPD's Manual for Groundwater Monitoring) may be used in cases of pump failures or if deemed to be a superior method based on well-specific conditions.

Sample integrity - the primary goal of this sampling and analysis plan is ensure that water samples obtained at this facility are representative of groundwater quality at the sampled location. In other words, this plan is designed to maintain sample integrity. Field personnel must be diligent at all times to avoid any action that might change the sample and affect sample integrity. Some examples of actions that can affect sample integrity are listed below. This is not intended to be an exhaustive list. A professional field team is required to constantly evaluate their procedures as they relate to sample integrity.

Contamination can be transferred from soils, to the sampler's hands, and then to the bottle and sample. Keeping hands clean and changing gloves frequently will minimize such risks. Similarly, strict adherence to the decontamination procedures above is necessary to prevent transferring contaminants into a well when measuring water levels. Dedicated purging and sampling equipment also reduces the chance of introducing contamination.

Contaminants in a water sample may be lost to the atmosphere or degraded by volatilization due to agitation while filling bottles or leaving bottles in the sun. Bottles should always be filled slowly and placed on ice as soon as possible to maintain sample integrity.

Any gasoline-powered equipment should be located downwind and at least 30 feet from the well to minimize exposure of samples to exhaust fumes. Electric equipment should be used in lieu of gasoline-powered equipment where possible.

At a minimum, monitoring instruments must be calibrated at the beginning of each day of a sampling event. Calibration will be conducted in accordance with the manfacturer's recommendations for the equipment used.

Samplers must pay special attention to recording detailed information to document conditions that may affect sample quality.

A. Monitoring Parameters and Frequency

The groundwater monitoring wells and surface water monitoring points will be monitored on a semi-annual basis for the following parameters and in accordance with the designated methods. Samples will be collected in containers provided by the analytical laboratory and preserved in accordance with the requirements for the analytical method. Samples for analysis of volatile organic compounds (VOCs) will be collected in special vials with septum caps and will be filled to the top and sealed with no headspace. Samples for analysis of metals will be unfiltered. VOC samples should be collected first and placed on ice immediately after collection.

Groundwater

GWB-7S, GWB-8S, GWB-9S, GWB-9SR,GWB-10, GWC-20SR, GWC-21SA, GWC-22SR, GWC-23S, GWC-24S, GWC-26, GWC-27, GWC-33, GWC-34, GWC-35, GWC-36, GWC-37, GWC-38, GWC-39, GWC-40, WW-1	Appendix I
GWA-6S, GWA-7, GWC-28R, GWC-29, GWC-30, GWC-31, GWC-32	Appendix I and Appendix III

Surface Water

SWA-2, SWA-3, SWC-3, SWC-4, SWC-5, SWC-6	SW Paramters

Appendix I Parameters as specified in Appendix I of 40 CFR 258, Subpart E, as amended, 56 Fed. Reg. 51032-51039 (October 9, 1991).

Parameters	*Container*	*Methods*	*Preservatives*	*Hold Time*
Volatile Organic Compounds	40 mL glass w/ Teflon-lined septa	8260	HCL and/or 4° C	7-14 Days
Metals	250 mL polyethylene	6010 OR 6020	HNO_3	180 Days

Appendix III Parameters as specified in Appendix III of 40 CFR 257, Subpart D, 80 Fed. Reg. 21468 (April 17, 2015).

Parameters	*Container*	*Methods*	*Preservatives*	*Hold Time*
Boron, Calcium	250 mL polyethylene	6010 OR 6020	HNO_3	180 Days
Chloride, Fluoride, Sulfate	250 mL polyethylene	300.0	4° C	28 Days
pH	None	Field Measurement	None	None
Total Dissolved Solids	250 mL polyethylene	SM 2540C	4° C	7 Days

Surface Water Parameters

Parameters	*Container*	*Methods*	*Preservatives*	*Hold Time*
Chloride	250 mL polyethylene	300.0	4° C	28 Days
Total Organic Carbon	40 mL glass w/ Teflon-lined septa	9060	HCL & 4° C	28 Days
Chemical Oxygen Demand	250 mL polyethylene	410.4	H_2SO_4 & 4° C	7 Days
Cyanide	250 mL polyethylene	9012	NaOH	180 Days
Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Nickel, Selenium, Silver, Zinc	250 mL polyethylene	6010 OR 6020	HNO_3	180 Days

Continued on Sheet 32

GEORGIA
Environmental Protection Division
Solid Waste Management Program

MINOR MODIFICATION APPROVAL

SOLID WASTE PERMIT NO. 040-008D(MSWL)

APPROVED BY: _____ DATE: 3/28/19

I, Darrell L. Webb, certify that this plan has been prepared under my direct supervision as a Qualified Groundwater Scientist and in accordance with the Georgia Rules for Solid Waste.

GEORGIA REGISTERED PROFESSIONAL ENGINEER No. 25864 DARRELL L. WEBB

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RECEIVED
MAR 06 2019
SOLID WASTE MANAGEMENT PROGRAM

REVISION HISTORY

DATE	DESCRIPTION
MARCH 20, 2001	REVISED BY HHNT
FEBRUARY 28, 2019	UPDATE FOR CCR MANAGEMENT PLAN

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DESIGN AND OPERATIONS PLAN
CRISP COUNTY US41S MSW LANDFILL
SITE #2 EXPANSION
PERMIT NO. 040-008D(MSW)
CRISP COUNTY, GEORGIA

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SCALE: NOT TO SCALE
EDIT DATE: FEBRUARY 28, 2019
PROJECT NUMBER: J1033
SHEET NAME: WATER MONITORING PLAN

B. Groundwater Sampling Procedures

Sampling should proceed from the cleanest location to the most contaminated. In the absence of contaminated wells, sampling should generally begin with background locations and proceed to sidegradient locations before sampling downgradient locations.

Decontamination - field equipment that comes into contact with water samples must be properly decontaminated to prevent introducing contamination from outside sources or other sampling locations. Based on the sampling protocols specified herein, the only equipment that should come into contact is the water level meter. The probe and tape of the meter should be cleaned with a laboratory-grade, non-phosphate detergent, followed by a distilled water rinse prior to placing the probe down a monitoring well. Any other equipment that is reused must be cleaned in the same manner before being placed in a monitoring well.

QA/QC Blanks

A Trip Blank (40 mL vials filled with distilled water in the laboratory) will be carried into the field, kept with groundwater samples through the entire sampling event, and submitted for laboratory analyses. At least one Trip Blank will be included in each sampling event and analyzed for Appendix I Volatile Organic Compounds (VOCs) to detect problems with sample storage that may have effected sample integrity.

Additionally, at least one Field Blank will be included in each sampling event to detect problems with sample collection that may have affected sample integrity. The Field blank will consist of distilled water carried to the field and handled like a sample. This will require pouring the distilled water into the properly decontaminated bailer (if bailers are reused) and then into sampling containers or using a properly decontaminated pump to transfer the distilled water into sampling containers if using non-dedicated pumps. For dedicated or disposable sampling equipment, the distilled water will be transferred directly to sampling containers by properly gloved field personnel under similar conditions as other groundwater samples (i.e., similar potential for dust or personnel contamination). Field Blanks will be analyzed for all parameters being analyzed in groundwater samples from the facility during the event.

(R) Low-Flow Purging and Sampling Procedure - Dedicated Pumps

Upon arriving at the well to be sampled,

1. Record the condition of the aboveground well structure noting missing locks, broken hinges, other damage or items of concern.
2. Establish a clean working area for equipment and sampling containers. Use clean polyethylene sheeting if needed.
3. Bring all sampling equipment to the well and connect air/electric source to the pump fittings on the well cap.
4. Don new nitrile gloves and connect the pump discharge tubing to the flow cell and direct the flow cell discharge into a measuring container. Shade flow cell from sun light to prevent heating groundwater.
5. Measure and record the water level in the well.
6. Start the pump at a low speed and increase the speed until discharge occurs.
7. Closely monitor the water level within the first 10-15 minutes of pumping to ensure minimal drawdown in the well. Adjust pump rate as needed to achieve a stabilized drawdown, if possible.
8. Once a stabilized drawdown has been achieved, the flow rate should remain constant throughout purging and sampling of the well.
9. After establishing the optimum flow rate, field parameters will be recorded at a frequency based on the flow rate and the volume of the flow cell. The minimum time between readings is the time required for one flow cell volume to be pumped from the well. For example, the minimum time between readings using a 0.5 liter flow cell and a flow rate of 0.1 liters per minute would be 5 minutes. Field parameters will include Depth to Water, pH, Specific Conductance (SC), Turbidity, Dissolved Oxygen (DO), Temperature, and Oxidation-Reduction Potential (ORP).
10. Continue purging until field parameters stabilize. Stabilization is indicated by three consecutive readings within the following limits:

    Turbidity: 10% or under 10 NTU
    DO: 10% or 0.2 mg/l, whichever is greater
    pH: 0.1 ph units
    SC: 5%

    Note: while purging the well, if the water level drops to the top of the pump, the pump should be stopped and the well allowed to recharge. Recharge should be sufficient to fill all required bottles at the same flow rate without dropping the water level below the top of the pump.
11. Following field parameter stabilization, samplers should don new nitrile gloves and disconnect the pump tubing from the flow cell. Sample bottles are then filled directly from the pump discharge tubing.
12. Disconnect and discard any disposable items, hang dedicated pump tubing in well, and decontaminate any reusable items.

(R) Low-Flow Purging and Sampling Procedure - Portable Pumps (QED Sample Pro or similar)

If a pump fails during a sampling event, the well may be sampled with a portable bladder pump such as the QED Sample Pro, and in accordance with SESDPROC-301-R4. For portable pumps, samplers will follow the following steps in addition to the above steps for dedicated pumps:

1. Record the condition of the aboveground well structure noting missing locks, broken hinges, other damage or items of concern.
2. Establish a clean working area for equipment and sampling containers. Use clean polyethylene sheeting if needed.
3. Bring all sampling equipment to the well and remove the well cap.
4. Decontaminate the pump in accordance with the decontamination procedures above.
5. Install a new bladder and reassemble the pump.
6. Install new tubing in accordance with the pump manufacturers requirements and, if needed, attach stainless steel safety wire of new cotton twine to the pump for lowering/retrieving the pump.
7. Lower the pump into the well slowly until it rests at least one foot from the bottom of the well.
8. Begin purging in accordance with the procedures in steps 4-12 for dedicated pumps detailed above.

Multi-Volume Purging and Sampling Procedure - Disposable Bailers

(R) Wells may be sampled with new, disposable bailers, if needed. Procedures must be consistent with SESDPROC-301-R4 and are detailed below.

1. Record the condition of the aboveground well structure noting missing locks, broken hinges, other damage or items of concern.
2. Establish a clean working area for equipment and sampling containers. Use clean polyethylene sheeting if needed.
3. Bring all sampling equipment to the well and remove the well cap.
4. Don new nitrile gloves and connect new nylon twine to a new disposable bailer.
5. Lower the bailer into the well and purge 3-5 well volumes from the well taking care to prevent the bailer or twine from touching anything other than the inside of the well or nitrile gloves.
6. If a well goes dry, it may be sampled as soon as it recovers enough to provide an adequate sample volume.
7. With the exception of metals samples, all samples should be collected at the end of the purging stage. Metals may be collected up to 24 hours after purging if needed to minimize turbidity.
8. Field parameters should be measured using the same equipment used for low-flow sampling with dedicated pumps, except no flow cell is required.

Surface Water Sampling Procedures

The following procedures should be used to collect surface water samples:

1. Don new nitrile gloves and hold the sample bottle.
2. Submerge the bottle into the surface water to approximately mid-depth
3. Open bottle while submerged and allow to fill, taking care not to overfill and lose preservatives
4. Closed bottle while submerged and remove from water body
5. Repeat for all required bottles

C. Analytical Laboratory Requirements

Water samples collected at this facility will be analyzed using updated methods in US EPA Manual SW-846, or other appropriate US EPA Method. Crisp County will be responsible for selecting an appropriate laboratory for analysis of Water samples collected at this facility. It is Crisp County's responsibility to ensure that the chosen laboratory is NELAP certified for the appropriate analytical methods being performed and that the laboratory is exercising a proper QA/QC program and specifies appropriate QA/QC procedures to be used in a laboratory work agreement.

Chain-of-Custody Procedures

Custody and protection of samples can be an important legal consideration. A Chain-of-Custody form will be used to document the handling of samples from the time of collection until delivery to the analytical laboratory. The form will indicate the sample identifier, collection date, collection time, and laboratory analyses required. The form will also contain the facility name and name of sampler.

The sampler is personally responsible for collected samples and must be able to attest to the integrity of samples until transfer. Samples should be kept in locked vehicles or otherwise secured to ensure that samples can't be manipulated between time of collection and transfer. Each transfer of custody will be recorded with an appropriate signature, date, and time. If the samples are shipped, they will be sealed. The driver will sign the custody form and a bill of lading will be secured.

V. REPORTING

Within 90 days of sample collection, a Groundwater Monitoring Report will be prepared and submitted to the EPD. The report will be prepared under the supervision of a Georgia Registered Professional Engineer (PE) or Geologist (PG) who will sign, seal and date the report. The report will include the following:

1. Dates of sampling and event identifier;
2. Discussion of site background including number of sampling points and any variances to this monitoring plan since it was last modified;
3. Discussion of any assessment or corrective actions being taken or any alternate source demonstrations approved previously;
4. Discussion of site appearance and maintenance, including signs of distressed vegetation or other visual indications of potential impacts;
5. Description of sampling procedures used to collect samples and any variances from this plan;
6. Description of the site hydrogeology, including flow rates. Provide a potentiometric map signed and sealed by a qualified groundwater scientist and showing groundwater flow directions;
7. Discussion of current results and conclusions;
8. Discussion of statistical analyses with supporting documentation;
9. Recommendations for future monitoring, assessment, corrective, or other actions;
10. Copies of field notes and forms;
11. Completed SWM-23 form;
12. Tabulated detection data for current event;
13. Laboratory report including chain of custody documents and documentation of NELAP certification;
14. Certification whether the facility is or is not in compliance with the rules of solid waste management section 391-3-4-.14.

A. Evaluation of Groundwater Results

While contamination may sometimes be evident from a cursory review of the monitoring results, statistical analyses will be used to provide a rigorous, technical evaluation of the monitoring data to detect potential contamination and, if detected, to determine if levels of contamination exceed regulatory limits. Appropriate statistical methods will be chosen from those listed in the Rules of Solid Waste Management, Chapter 391-3-4.14, paragraph 18, and will be consistent with the EPA Unified Statistical Guidance, 2009.

Analyses will be conducted in general accordance with the March 2009 EPA document titled "Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities - Unified Guidance" or updated versions. Statistical methods used must be consistent with the Georgia Department of Natural Resources, Rules of Solid Waste Management.

If a statistically significant increase (SSI) over background concentrations is indicated, the facility will initiate assessment monitoring within 90 days unless it can demonstrate that a source other than the landfill caused the contamination or that the SSI resulted from an error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. A report documenting any such demonstration must be certified by a qualified groundwater scientist and submitted to the EPD.

B. Evaluation of Surface Water Results

Surface water monitoring results will be plotted on time series graphs and analyzed visually to detect trends that might indicate a release from the facility to surface water. Upgradient surface water samples will be used to distinguish background impacts from facility impacts.

C. Assessment Monitoring

(R) If a statistically significant increase over background levels is indicated and the increase can't be attributed to factors other than the facility's operations, an assessment monitoring program will be initiated for the facility. Wells in the CCR subset will be sampled for parameters in Appendix IV of 40 CFR 257, Subpart D, and/or parameters in Appendix II of 40 CFR 258, Subpart E. Wells not in the CCR subset will be sampled for parameters in Appendix II of 40 CFR 258, Subpart E. A subset of wells and/or constituents may be chosen for assessment monitoring if acceptable to the EPD.

(R) Site-specific Groundwater Protection Standards (GWPS) will be established for all verified Appendix II or IV constituents detected above background levels. The GWPS will based on Maximum Contaminant Levels (MCLs) or, if no MCL has been established, site-specific risk-based levels.

Once an appropriate GWPS has been established for each constituent found to be a statistically significant increase over background concentrations, additional statistical analyses will be completed to compare the concentrations of each such constituent to the established GWPS. This analysis will be used to determine if the detected concentrations are statistically above the GWPS (SSIs over GWPS). If an SSI over GWPS is indicated, the facility will:

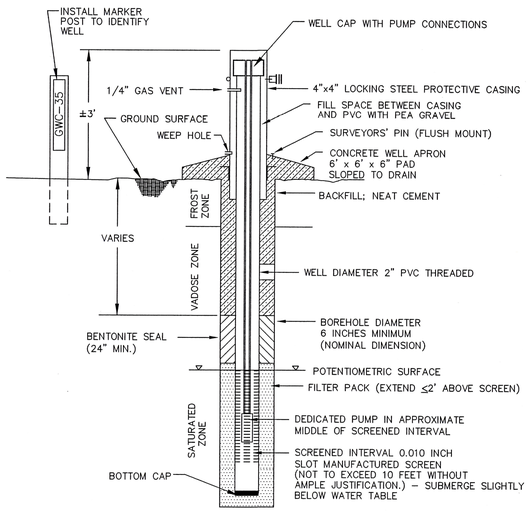
(R)
1. Within 14 days of determining that a GWPS has been exceeded, place a notice in the operating record identifying the constituents that exceed the GWPS;
2. Notify the local governing authorities of Crisp County of any release from the site of a contaminant which is likely to pose a danger to human health and publish a notice of such release in the legal organ of Crisp County;
3. Install additional wells as needed to characterize the nature and extent of the release. Include at least one well at the property boundary downgradient of wells indicating a release over GWPS;
4. If contamination is deemed to have reached the facility's property boundary, notify owners adjacent to the boundary where contamination has been verified;
5. Initiate an Assessment of Corrective Measures (ACM) in accordance with the Georgia Department of Natural Resources, Rules of Solid Waste Management 391-3-4-.14 (paragraphs 34-41)

VI. MONITORING SYSTEM MAINTENANCE AND ACCESS

(R) The facility owner is responsible for maintaining signage and access to environmental monitoring locations at all times. Groundwater Monitoring locations must be easily accessible, locked, and marked in accordance with the signage requirements detailed in section III.A of this plan. Surface water locations will be marked with weather-resistant posts (such as pressure-treated 4" x 4" posts or metal stakes) and 3-inch or larger lettering and trails to sample locations must be cleared routinely. Samplers will inspect monitoring locations and signage for damage during routine sampling events. Any repairs needed will be completed within 45 days of discovery, with photographic documentation sent to EPD.

(R) In addition, all wells will be inspected by a professional engineer or professional geologist once every five years, and at site closure, in accordance with the Water Well Standards Act. The professional will be required to certify the integrity of each well and, if needed, supervice any remedial actions required to ensure the well integrity.

(R) Any monitoring well found to be damaged beyond repair, dry for two consecutive routine sampling events, or otherwise not capable of meeting the specifications in this plan will be replaced unless otherwise approved by the EPD.



GROUND WATER MONITORING WELL

GEORGIA
Environmental Protection Division
Solid Waste Management Program

MINOR MODIFICATION APPROVAL

SOLID WASTE PERMIT NO. 040-008 D(MSWL)

APPROVED BY: JAA DATE: 3/28/19

I, Darrell L. Webb, certify that this plan has been prepared under my direct supervision as a Qualified Groundwater Scientist and in accordance with the Georgia Rules for Solid Waste.

GEORGIA REGISTERED PROFESSIONAL No. 25814 ENGINEERED DARRELL L. WEBB

ADVANCED ENVIRONMENTAL MANAGEMENT, INC.
3482 KEITH BRIDGE RD. #137, CUMMING, GEORGIA 30041
PHONE: 770-242-8282, E-MAIL: MAIL@AEM-GA.COM

RECEIVED
MAR 06 2019
SOLID WASTE MANAGEMENT PROGRAM

LANIER ENGINEERING INC.
1504 W. THIRD AVENUE ALBANY, GEORGIA 31707
(229) 438-0522 FAX (229) 438-0921

REVISION HISTORY	
DATE	DESCRIPTION
MARCH 20, 2001	REVISED BY HHNT
FEBRUARY 28, 2019	(R) UPDATE FOR CCR MANAGEMENT PLAN

GEORGIA REGISTERED PROFESSIONAL No. 25814 ENGINEERED DARRELL L. WEBB

DESIGN AND OPERATIONS PLAN
CRISP COUNTY US41S MSW LANDFILL
SITE #2 EXPANSION
PERMIT NO. 040-008D(MSW)
CRISP COUNTY, GEORGIA

BROWNE AND COMPANY, LLC
2719 Sheraton Drive • Building C, Suite 210
Macon, Georgia 31204 PH/FX: 478-743-4843

SCALE NOT TO SCALE
EDIT DATE FEBRUARY 28, 2019
PROJECT NUMBER J1033
SHEET NAME WATER MONITORING PLAN

SHEET 32 OF 35

⚠R THIS SHEET INTENTIONALLY LEFT BLANK

GEORGIA
Environmental Protecilon Division
Solid Waste Management Program

MINOR MODIFICATION APPROVAL

SOLID WASTE PERMIT NO. 040-008D(MSWL)

APPROVED BY: _____ DATE: 3/28/19

I, Darrell L. Webb, certify that this plan has been prepared under my direct supervision as a Qualified Groundwater Scientist and in accordance with the Georgia Rules of Solid Waste

GEORGIA REGISTERED PROFESSIONAL No. 25864 DARRELL L. WEBB

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REVISION HISTORY

DATE		DESCRIPTION
FEBRUARY 28, 2019	R⚠	UPDATE FOR CCR MANAGEMENT PLAN

GEORGIA REGISTERED No. 25864 PROFESSIONAL ENGINEER DARRELL L. WEBB

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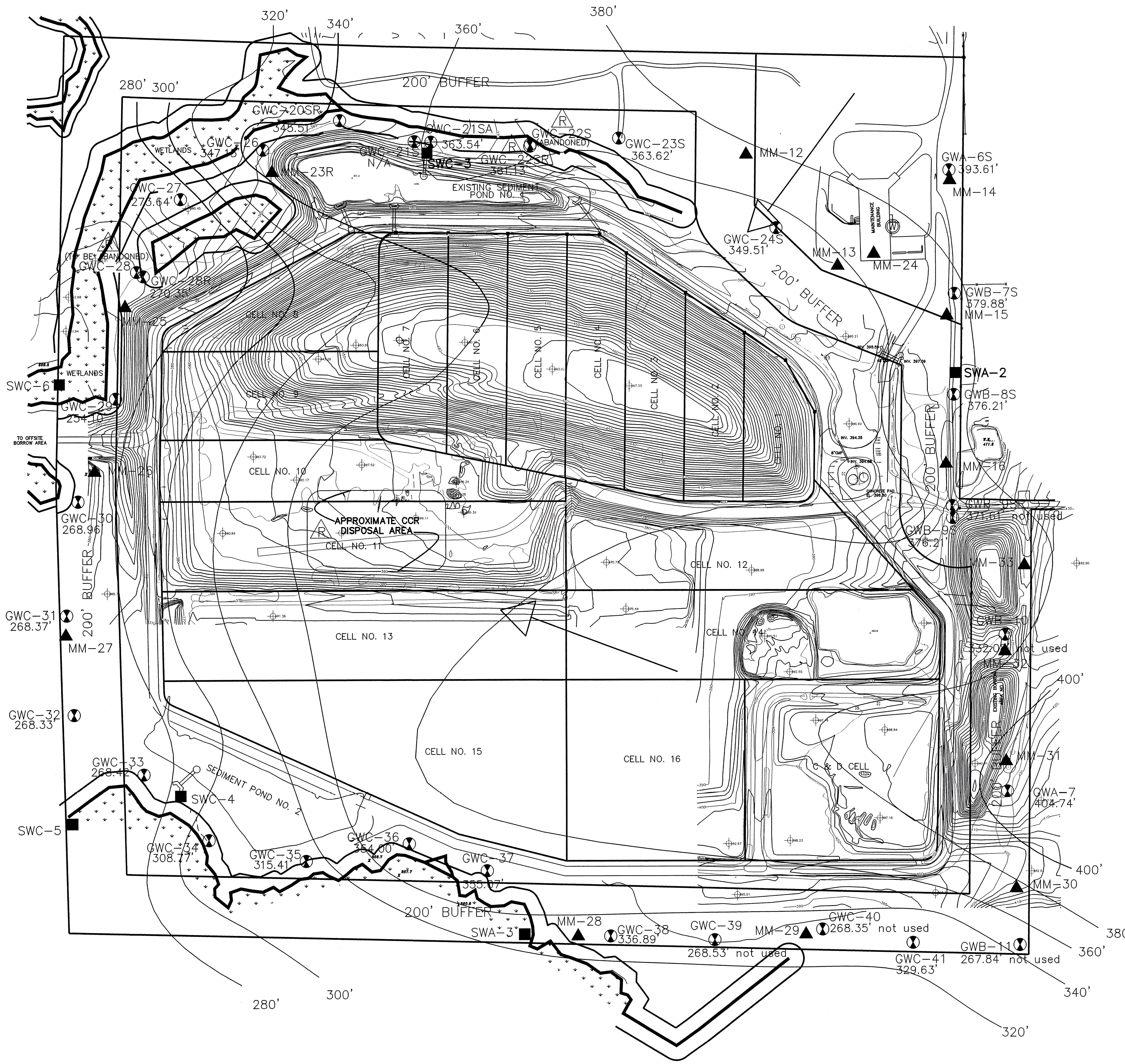

LEGEND

- EXISTING ON-SITE WATER WELL PROPOSED TO BE MONITORED
- EXISTING METHANE GAS MONITORING POINT
- EXISTING GROUNDWATER MONITORING WELL
- EXISTING SURFACE WATER MONITORING POINT

N

GRAPHIC SCALE

200 0 100 200 400 800

(IN FEET)
1 inch = 200 ft.

Potentiometric Elevations measured May 30, 2018

GEORGIA
Environmental Protection Division
Solid Waste Management Program

MINOR MODIFICATION APPROVAL

SOLID WASTE PERMIT NO. 040-008D (MSWL)

APPROVED BY: [signature] DATE: 3/28/19

I, Darrell L. Webb, certify that this plan has been prepared under my direct supervision as a Qualified Groundwater Scientist and in accordance with the Georgia Rules for Solid Waste.

[signature] [seal: GEORGIA REGISTERED PROFESSIONAL No. 25564 ENGINEER DARRELL L. WEBB]

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REVISION HISTORY

DATE	DESCRIPTION
MARCH 20, 2001	REVISED BY HHNT
JANUARY 27, 2009	REVISED PER C&D AREA
FEBRUARY 28, 2019	UPDATE FOR CCR MANAGEMENT PLAN

[seal: GEORGIA REGISTERED PROFESSIONAL ENGINEER No. 25864 DARRELL L. WEBB] [signature]

DESIGN AND OPERATIONS PLAN
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SCALE 1" = 200'
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PROJECT NUMBER J1033
SHEET NAME ENVIRONMENTAL MONITORING PLAN

SHEET 35 OF 35